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A Synopsis of the Genus *Blakea* (Melastomataceae) in Mexico and Central America

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ABSTRACT. A regional synopsis of the genus *Blakea* is presented that recognizes 33 species in Mexico and Central America. This summary includes a key, distributional and phenological information, notes on morphological variation, and discussions that provide rationale for relegating six binomials to synonymy. Descriptions and diagnoses are presented for four new species of *Blakea* (*B. coloradensis*, *B. darcyana*, and *B. perforata* from Panama; and *B. wilsoniorum* from southern Costa Rica and Panama). Analysis of the type specimens and recently collected flowering material of *Topobea storkii* necessitates its transfer to *Blakea*. Three other species (*B. cuatrecasii*, *B. repens*, and *B. subconnata* var. *obtusa*), all of which were previously known from Andean South America, are reported from Panama for the first time.

Blakea, with approximately 100 species, is one of two berry-fruited genera comprising the natural neotropical tribe Blakeeae (Almeda, 1990). It is best represented in wet montane regions from southern Mexico and the West Indies to Bolivia and Brazil. Although northwestern South America is undoubtedly the center of species richness for *Blakea* (Wurdack, 1973), southern Central America is clearly the area of focal importance for unusual diversity in floral morphology. This floral diversity reflects adaptations to a broad array of important pollinators in the region, including rodents, buzzing bees, and hummingbirds (Almeda, 1990; Lumer, 1981; Lumer & Schoer, 1986). For a woody genus with showy, often spectacular, flowers, it is surprising that *Blakea* has escaped the attention of serious students until recently. The genus has not been treated in its entirety since Cogniaux's (1891) familial monograph. Even the most recent floristic treatments of the family Melastomataceae for the Mesoamerican region appeared over 30 years ago (Gleason, 1958; Standley, 1924, 1938; Standley & Williams, 1963; Winkler, 1965) when many areas were still little-explored and poorly known botanically.

The account presented here is a precursor to the treatment that will appear in *Flora Mesoamericana*. Four new species and one new generic transfer are proposed in the context of a regional synopsis. This summary also includes a key to the 33 recognized species, distributional and phenological information, notes on variation, and discussions that provide rationale for relegating previously recognized species to synonymy.

TAXONOMIC TREATMENT

Blakea P. Browne, Civ. Nat. Hist. Jamaica 323. 1756. TYPE: *Blakea trinervia* P. Browne.

Trees, shrubs, or woody vines, often epiphytic with glabrous or variously pubescent, terete or quadrate branchlets. Leaves thick and coriaceous or chartaceous, 3- to 5-nerved or -plinerved with the transverse secondary veins (when evident) closely spaced, straight, and parallel. Flowers 6-merous, axillary, solitary or fascicled, typically pedunculate in the upper leaf axils and subtended by two pairs of decussate, free or variously fused, coriaceous or foliaceous, sessile bracts inserted at the base of the hypanthium. Hypanthia campanulate or

hemispheric; calyx persistent or deciduous, rarely calyptrate, truncate or 2- to 6-lobate. Petals 6, white, pink, magenta, red, or some combination of these colors, glabrous but often marginally ciliolate. Stamens 12, isomorphic and glabrous; anthers oval, oblong, or elliptic, laterally compressed, bluntly obtuse, obconic, or broadly rounded at the summit, free or laterally connate with two typically well-separated apical pores; connective thickened and unappendaged or dilated basally into a dorsal deflexed, horizontal, or upturned spur. Stigma punctiform to capitate. Ovary inferior, usually 6-locular. Fruit baccate; seeds ovoid, clavate, or narrowly pyriform, testa smooth.

Blakea and the closely related genus *Topobea* are the only two genera comprising the tribe Blakeeae. This tribe is characterized by axillary flowers that are individually subtended by two pairs of decussate bracts, baccate fruits, ovoid to pyramidal, smooth seeds, and wood with multiseriate rays and the frequent occurrence of druses (Almeda, 1990). Flowering material is essential for the unequivocal generic placement of species in this tribe. In *Blakea*, each flower has 12 stamens; the anthers are biporose, oval, oblong, or elliptic, compressed laterally, bluntly obtuse or broadly rounded apically with two typically well-separated (typically minute) pores. In *Topobea* the flowers also commonly have 12 stamens, although several hexandrous and one octandrous species occur in Costa Rica and Panama; the anthers of *Topobea*, in contrast to those of *Blakea*, are uniporose or biporose, linear-oblong to oblong-subulate or rostrate, usually not compressed laterally, and with approximate or confluent dorsally inclined broad pores.

The posture and orientation of stamens and the shape, length, and degree of fusion of floral bracts are important diagnostic characters in *Blakea*. Pressing and drying often conceal these features, frequently necessitating a dissection of hydrated material. This is especially important when analyzing the species with large enveloping foliaceous floral bracts. Because of the prevalence of epiphytism in *Blakea*, coupled with the local distribution of many taxa, it seems likely that additional species will be discovered as forest canopies and remote areas are explored. Inadequate material of several collections from Costa Rica and Panama probably represent additional species for the area covered by this study. Their identity will require evaluation when better material is collected.

Key to the Species of *Blakea* in Mexico and Central America

1a. Flowers always pendent, petals imbricate or convolute when fully expanded to form a subcylindric tube-like corolla concealing the stamens, which form a ring around the straight style.
- 2a. Petals uniformly pink or magenta; floral bracts and calyx lobes red in color . . . . . 14. *B. fuchsioides*
- 2b. Petals green or green flushed with purple or reddish at the base; floral bracts and calyx lobes not red in color.
  - 3a. Leaf blades modified adaxially at the petiole-laminar junction into flap-like saccate pouches, the basal and lateral margins of which are free from but conspicuously decurrent on the petiole.
    - 4a. Pubescence of uppermost internodes consisting of hairs 1–2 mm long; leaf blades bluntly denticulate; outer floral bracts linear-lanceolate, 15–21 mm long, equaling or exceeding the calyx lobes at anthesis; Costa Rica (Cerro Chompipe, Volcán Barva, and Volcán Irazú) . . . . . 2. *B. austin-smithii*
    - 4b. Pubescence of uppermost internodes consisting of hairs mostly less than 0.5 mm long; leaf blades entire; outer floral bracts ovate to elliptic-ovate, 5.5–9 mm long, conspicuously shorter than the calyx lobes at anthesis; Costa Rica (Cordillera de Tilarán, Cordillera de Guanacaste) . . . . . 5. *B. chlorantha*
  - 3b. Leaf blades not modified adaxially at the petiole-laminar junction into flap-like saccate pouches.
    - 5a. Older petioles, floral peduncles, and bracts essentially glabrous, outer floral bracts 13–17 mm wide on fruiting hypanthia; Costa Rica (Cordillera de Talamanca and Volcán Barva) . . . . . 23. *B. penduliflora*
    - 5b. Older petioles, floral peduncles, and bracts moderately to copiously covered with appressed or spreading brown hairs; outer floral bracts 5–9 mm wide on fruiting hypanthia.
      - 6a. Uppermost internodes and elevated primary nerves on abaxial leaf surfaces moderately to densely covered with spreading brown hairs less than 0.5 mm long; floral peduncles (2.0–)2.8–3.8 cm long; outer floral bracts 1.3–2.0 cm long; Mexico (Chiapas) and western Guatemala (Quezaltenango and San Marcos) . . . . . 25. *B. purpusii*
      - 6b. Uppermost internodes and elevated primary nerves on abaxial leaf surfaces densely covered with appressed brown hairs 1–2.5 mm long; floral peduncles 1.2–2.0 mm long; outer floral bracts 0.7–0.8 cm long; western Panama (Chiriquí) . . . . . 17. *B. gregii*

1b. Flowers erect or antrorsely divergent but never truly pendent, petals white, pink, magenta, red, or some combination of these colors, the petals well separated from one another or connivent when fully expanded but never forming a tube-like corolla that conceals the stamens.

7a. Calyx lobe apex elaborated into a deflexed ovate to cordate foliaceous appendage; style glandular-puberulent; cauline nodes lacking stipuliform setose flaps.
8a. Leaf blades (12.2–)19–35 × (10–)17–35.5 cm, cordate to ovate-orbicular; petioles 4.5–11.2 cm long; floral peduncles 0.7–1.6 cm long; anther sacs free from one another but connivent in a ring around the style . . . . . 31. *B. tuberculata*
8b. Leaf blades (6.3–)10.3–20.7 × 5.2–10.3 cm, elliptic to elliptic-ovate; petioles 1.5–3.7 cm long; floral peduncles 0.4–0.9 cm long; anther sacs laterally connate in a ring around the style . . . . . 4. *B. calycosa*
7b. Calyx lobe apex not elaborated into a foliaceous appendage; style glabrous, or if glandular-puberulent, then uppermost cauline nodes bearing stipuliform setose flaps.
9a. Inner and outer floral bracts essentially free to the base.
10a. Adaxial leaf surface copiously covered with smooth or gland-tipped hairs; calyx lobes filiform . . . . . 32. *B. wilburiana*
10b. Adaxial leaf surface essentially glabrous; calyx lobes not filiform.
11a. Leaves at a node strongly dimorphic in size.
12a. Leaf blades subpeltate at the base, lacking inconspicuous domatia in the angles between the median vein and each of the two innermost veins on the abaxial surface . . . . . 18. *B. guatemalensis*
12b. Leaf blades not subpeltate at the base, inconspicuous domatia (these often ruptured) typically formed in the angles between the median vein and each of the two innermost veins on the abaxial surface . . . . . 13. *B. foliacea*
11b. Leaves at a node not strongly dimorphic in size.
13a. Leaves sessile, auriculate to cordate-clasping at the base . . . . . 12. *B. elliptica*
13b. Leaves petiolate, not auriculate or cordate-clasping at the base.
14a. Outer floral bracts distinctly shorter than the hypanthium.
15a. Calyx fused and concealing petals in bud but rupturing at anthesis into 3–4 persistent or tardily deciduous lobes . . . . . 1. *B. anomala*
15b. Calyx lobes not fused and concealing petals in bud.
16a. Leaf blades bearing irregularly rupturing domatia in the angles between the median vein and each of the two proximal lateral veins on the abaxial surface; floral peduncles 1.3–4.8 cm long.
17a. Calyx lobes obsolete or evident only as depressed deltoid undulations; anther thecae laterally connate . . . . . 22. *B. pauciflora*
17b. Calyx lobes broadly ovate, 1–1.5 mm long and 2.5–3.5 mm wide basally; anther thecae free . . . . 19. *B. hammelii*
16b. Leaf blades lacking irregularly rupturing domatia in the angles between the median vein and each of the two proximal lateral veins on the abaxial surface; floral peduncles 0.5–1.2 cm long . . . . . 20. *B. herrerae*
14b. Outer floral bracts equaling or exceeding the hypanthium in length.
18a. Calyx consisting of a truncate flange, the lobes obsolete or merely low undulations.
19a. Floral peduncles 0.9–1.2 cm long; anther thecae free . . . . . 11. *B. darcyana*, sp. nov.
19b. Floral peduncles 2.1–4.2 cm long; anther thecae laterally connate.
20a. Petals white with a flush of pink on the abaxial margins; anthers yellow, the apex rounded; hypanthium somewhat to markedly costulate in post-anthesis . . . . . 15. *B. gracilis*
20b. Petals pink throughout; anthers pink or pale yellow-white, the apex bluntly obconic; hypanthium terete and smooth in post-anthesis . . . . . 21. *B. litoralis*
18b. Calyx consisting of well-defined lobes.
21a. Uppermost branchlet nodes bearing setose stipuliform flaps 1–2 × 4–6 mm; style glandular-puberulent . . . . . 26. *B. repens*
21b. Uppermost branchlet nodes lacking setose stipuliform flaps; style glabrous.
22a. Uppermost internodes quadrangular with carinate angles and interpetiolar ridges created by the basally vaginate petioles; leaf base acute to obtuse with the innermost pair of primary veins usually poculate-coalesced with the median vein on the abaxial surface . . . . . 29. *B. subconnata* var. *obtusa*
22b. Uppermost internodes essentially terete; leaf base obtuse to rounded with inconspicuous domatia (these often ruptured) typically formed in the angles between the median

vein and each of the two innermost primary veins and sometimes in the angle of the outermost lateral veins as well on the abaxial surface . . . . . 13. *B. foliacea*

9b. Inner and/or outer floral bracts partially fused to completely fused for their entire length.

23a. Leaves sessile, auriculate to cordate-clasping at the base . . . . . 12. *B. elliptica*

23b. Leaves petiolate, neither auriculate nor cordate-clasping at the base.

24a. Nodes of upper branchlets swollen and often bearing small holes 1–2 mm diam. on the leaf scars that lead to domatia presumably occupied by ants . . . . . 24. *B. perforata*, sp. nov.

24b. Nodes of upper branchlets not as above.

25a. Calyx fused and concealing petals in bud, the calyptra or lobes ultimately deciduous.

26a. Calyx calyptrate and falling away as a unit; the prominently lobed floral bracts superficially resembling the calyx; anthers 9.5–10 × 6–7 mm . . . . . 7. *B. costaricensis*

26b. Calyx rupturing at anthesis into two to six ovate-oblong deciduous lobes, ultimately leaving a truncate flange or tube on fruiting hypanthia; anthers 5–7 × 2–4 mm.

27a. Flowers essentially sessile; petals 2–2.2 × 1.4–1.8 cm; anthers laterally connate, 5 × 2 mm . . . . . 8. *B. crinita*

27b. Floral peduncles 0.9–3 cm long; petals 3.5–5.3 × 3–4 cm; anthers free, 7 × 3.5–4 mm . . . . . 3. *B. brunnea*

25b. Calyx not fused and not concealing petals in bud, or if calyx is fused in bud, then the lobes rupturing regularly and persisting on fruiting hypanthia.

28a. Inner floral bracts free to the base; anther thecae laterally connate for at least half of their length . . . . . 9. *B. cuatrecasii*

28b. Inner floral bracts fused basally for at least half of their length; anther thecae free.

29a. Petals brilliant red with a small white band at the base; anther connective prolonged dorsally into an upturned spur 3–5 mm long . . . . . 27. *B. scarlatina*

29b. Petals white, pink, or some combination of these colors; anther connective not prolonged dorsally into an acute spur.

30a. Inner floral bracts connate for essentially their entire length to form a cupulate truncate collar that closely envelops the hypanthium.

31a. Outer floral bracts fused for half or more of their length and closely enveloping inner floral bracts and the hypanthium; fruiting hypanthia 1.5–2 cm long.

32a. Outer floral bracts exceeding the inner floral bracts in length and typically concealing them on flowering and fruiting hypanthia; peduncles on fruiting hypanthia 1.2–2 cm long . . . 33. *B. wilsoniorum*, sp. nov.

32b. Outer floral bracts somewhat shorter than the inner floral bracts, the distal portion of inner bracts visible on flowering and fruiting hypanthia; peduncles on fruiting hypanthia 2.5–5 cm long . . . . . 28. *B. storkii*

31b. Outer floral bracts fused for less than half of their length, the lobes spreading and not closely enveloping inner floral bracts or the hypanthium; fruiting hypanthium 0.5–0.7 cm long . . . . . 6. *B. coloradensis*, sp. nov.

30b. Inner floral bracts connate for only a portion of their length to form a 2-lobed collar that only partially envelops the hypanthium.

33a. Floral peduncles (1.5–)2.7–4 cm long; petals 2.8–3.8 × 2–3.2 cm, white only flushed with pink apically and along the margins . . . . . 16. *B. grandiflora*

33b. Floral peduncles 0.4–1.2 cm long; petals 1.5–2.5 × 0.7–1.8 cm, entirely pink or white.

34a. Uppermost nodes beset with an interpetiolar tuft of coarse hairs that falls away to leave a distinct interpetiolar ridge or line; leaf blades not white-punctulate adaxially when dry; outer floral bracts fused basally for 3–6 mm; petals white; Costa Rica . . . . . 30. *B. tapantiana*

34b. Uppermost nodes not beset with an interpetiolar tuft of coarse hairs that falls away to leave a distinct

interpetiolar ridge or line; leaf blades white punctriculate adaxially when dry; outer floral bracts fused basally for 7–10 mm; petals pink; Belize, Guatemala, and Honduras . . . . . 10. *B. cuneata*

1. Blakea anomala Donnell Smith, Bot. Gaz. 42: 297. 1906. TYPE: Costa Rica. San José: In truncis putridis ad La Palma, 1450–1550 m, Sep. 1896, *Pittier 10165* (syntype, US; isosyntypes, BR, CR, NY); Costa Rica. San José: In truncis putridis ad La Palma, 1450–1550 m, Sep. 1896, *Tonduz 12521* (syntype, US; isosyntype, NY).

Distribution and phenology. Endemic to Costa Rica where it can be locally common in cloud forests of the Cordillera Central and Cordillera de Talamanca at 700–1800(–2400) m. Collected in flower from September through April, fruiting into August.

Blakea anomala is readily recognized by its irregularly rupturing calyx, small scalelike floral bracts, and laterally connate anthers. This species exhibits two modal tendencies with respect to pubescence and shape of the leaf base. The syntypes (*Pittier 10165* and *Tonduz 12521*) have copiously setose-furfuraceous upper internodes with leaves that also have varyingly persistent pubescence abaxially, and leaf bases that are subcordate to rounded. This form varies through a series of less pubescent intermediates to individuals that are nearly glabrous or at most scurfy puberulent on vegetative buds with leaves that are mostly basally acute. The glabrous populations also have conspicuous elevated interpetiolar ridges on the uppermost twigs, but these are lacking or not readily evident in the pubescent populations represented by the syntype material cited herein. Judging from available collections examined for this study, the glabrous variant is the more widespread form. The differences exhibited by these two extremes do not seem to correlate with other characters, nor do they appear to be correlated with geographic or elevational differences. The extremes when compared side by side are impressive, but they are bridged by many intermediates that make formal taxonomic recognition pointless and arbitrary. Therefore, the species as recognized here is considered variable and polymorphic. Perhaps the observed differences are the result of repeated hybridization between two formerly distinct entities.

2. Blakea austin-smithii Standley, Field Mus. Nat. Hist., Bot. Ser. 18: 1561. 1938. TYPE: Costa Rica. Alajuela: Palmira, 2200 m, Mar. 1938, *A. Smith H382* (holotype, F; isotype, MO).

Distribution and phenology. Endemic to Costa Rica where it is largely restricted to cloud forests on slopes of the Cordillera Central at 1500–2400 m. Collected in flower from November through March, in fruit from February through April.

Among the species of *Blakea* with pendent green flowers, *B. austin-smithii* is distinguished by its saccate pouches at the petiole-laminar junction, bluntly denticulate leaf blades, and linear-lanceolate outer floral bracts that equal or exceed the calyx lobes at anthesis.

3. Blakea brunnea Gleason, in Woodson & Schery, Ann. Missouri Bot. Gard. 28: 435. 1941. TYPE: Panama. Chiriquí: vicinity of Bajo Chorro, 1900 m, 20–22 July 1940, *Woodson & Schery 618* (holotype, NY; isotype, MO).

Distribution and phenology. Endemic to the cloud forests of western Panama at 900–2300 m. Flowering collections have been made in January, March, and August, fruiting collections in July and December.

The flowers of this species, which measure 13.5 cm across when fresh, are the largest of any known member of the Melastomataceae in the Mesoamerican region. The large flowers, rupturing calyx, and mixture of stout conic and flattened hairs on floral peduncles and young vegetative organs readily distinguish this species.

4. Blakea calycosa Gleason, Phytologia 1: 342. 1939. TYPE: Panama. Coclé: vicinity of El Valle, 600–1000 m, 14 May 1939, *Allen 1788* (holotype, NY; isotypes, F, MO, US).

Distribution and phenology. Local and uncommon in cloud forests of Costa Rica and Panama at 600–1400 m. Flowering and fruiting collections have been made from August through March.

Blakea calycosa is most similar to *B. tuberculata* with which it shares several diagnostic characters such as tuberculate petals, glandular-puberulent styles, reflexed foliaceous appendages at the tip of each calyx lobe, and similar anther appendages. They share a similar indument on young vegetative buds that consists of variously roughened subulate hairs. After examining types and numerous collections of both taxa, I have concluded that these two species are closely related but distinct and worthy of continued recognition. Diagnostic character dif-

ferences include foliar shape and size (shorter and narrower in *B. calycosa*), petiole and petal length (longer in *B. tuberculata)*, free vs. laterally connate anther sacs (in *B. calycosa)*, and staminal appendage posture (deflexed in *B. calycosa* vs. upturned in *B. tuberculata*). The taxonomy of this species pair is complicated, however, by a series of some 25 anomalous collections from Costa Rica and Panama that do not fit comfortably into either taxon. A collection from the Caribbean slope of Costa Rica, for example (*de Nevers et al. 7797*, CAS), has leaf blades that are shaped like *B. calycosa* but approach *B. tuberculata* in overall size. In flower size this collection is intermediate between the two taxa, and it has the prominent ovary cone and collar of the latter. Another collection (*McPherson 7183*, CAS) from Cerro Tute, Panama, has petioles that approach *B. tuberculata* in length, leaf blades that are intermediate in size and shape, flowers that are intermediate in size, and an ovary apex that is modified into a low elevated cone surrounded by widely spaced glandular hairs reminiscent of *B. calycosa.* Field studies are needed to better evaluate the status of these enigmatic populations and to determine whether hybridization and introgression are responsible for the observed patterns of variation.

5. Blakea chlorantha Almeda, Rhodora 82: 609. 1980. TYPE: Costa Rica. Puntarenas: 3–3.5 km SE of Santa Elena and 2–3 km E of Monteverde on the Peñas Blancas trail, Cordillera de Tilarán, 1500–1540 m, 19 Dec. 1973, *Almeda et al. 2005* (holotype, DUKE; isotypes, CAS, CR, MO, NY, US).

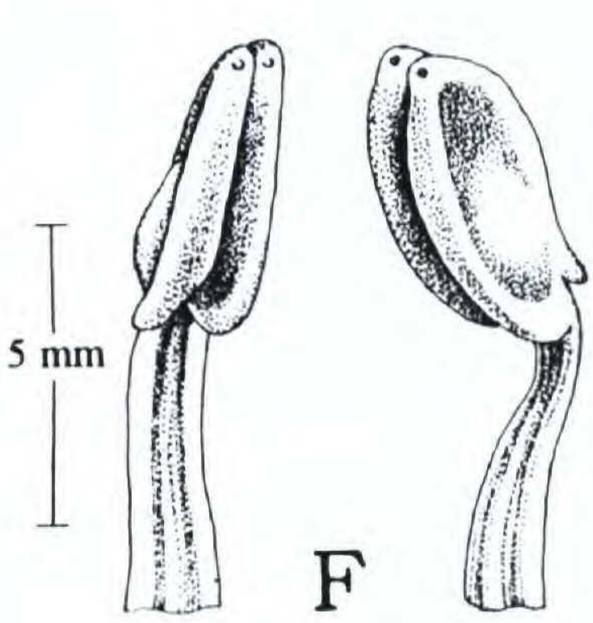
Distribution and phenology. Endemic to Costa Rica where it is confined to the Cordillera de Tilarán and adjacent areas in cloud forest, elfin woodland, and windswept ridges at 900–1800 m. Collected in flower from October through May, in fruit from January through May.

This species is readily recognized by its semicircular pseudoformicarial pouches at the petiole-laminar junction, entire leaf blades, and ovate to elliptic-ovate outer floral bracts that are conspicuously shorter than the calyx lobes at anthesis.

6. Blakea coloradensis Almeda, sp. nov. TYPE: Panama. Chiriquí/Bocas del Toro border: cloud forest off road to Cerro Colorado, 1450 m, 26 Jan. 1989, *Almeda et al. 6417* (holotype, CAS; isotypes, MEXU, MO, NY, PMA, US). Figure 1.

Frutex epiphyticus 2–3 m altus. Petioli 0.6–1.7 cm longi; lamina 6.4–12.5 × 3.2–5.8 cm elliptica apice acuminata basi acuta vel obtusa ad maturitatem coriacea et glabra, 5-nervata, nervis secundariis 1.5–2 mm inter se distantibus. Flores 6-meri in quoque nodo superiore 1–2, peduncularis 2–4.5 cm longis; bracteae exteriores 4–6 × 9–10 mm ovatae ad basim paulo (1.5–2 mm) coalitae; bracteae interiores 6–7 mm retusae vel subemarginatae omnino coalitae. Hypanthium (ad torum) 5–7 mm longum; calycis tubus ca. 3 mm longus, lobis 3–4 × 4–6 mm rotundatis usque truncatis. Petala 1.7–1.9 × 1.6–1.8 cm obovata apice rotundato. Antherae 4–5 × 1–1.5 mm oblongae inter se lateraliter non cohaerentes apice minute biporosae; connectivum ad basim dorsaliter paulo elevatum. Ovarium 6-loculare, cono glabro (collo non evoluto).

Epiphytic shrub 2–3 m tall. Upper branchlets glabrous and sparingly lenticellate, distinctly quadrate to sulcate becoming rounded-quadrate with age. Vegetative buds, young petioles and floral buds, and the adaxial surface and elevated primary veins of immature leaves moderately to densely covered with a brownish scurfy indument of mealy ill-defined matted particles. Mature leaves of a pair equal to somewhat unequal in size, essentially glabrous on both surfaces; petioles 0.6–1.7 cm long; blades coriaceous, 6.4–12.5 × 3.2–5.8 cm, elliptic, apex acuminate, base acute varying to obtuse, margin entire to subentire, 5-nerved, the transverse secondary veins spaced 1.5–2 mm apart at the widest portion of the blade. Flowers erect, 1 or 2 in each leaf axil of uppermost branches; peduncles 2–4.5 cm long, rounded-quadrate, glabrous and lenticellate. Floral bracts sessile, outer bracts 4–6 × 9–10 mm, fused basally for 1.5–2 mm, flaring to form a skirtlike collar, depressed-ovate, apex bluntly retuse to subemarginate, margin entire but ± undulate-involute, 3-veined, glabrous throughout; inner bracts connate for their entire length to form an unlobed cuplike collar 6–7 mm long that closely envelops the hypanthium. Hypanthium (in post anthesis) campanulate, 5–7 mm long to the torus and 8–10 mm diam., glabrous. Calyx tube ca. 3 mm long; free portions of calyx lobes 3–4 mm long and 4–6 mm wide basally, rounded-truncate, margin coarsely entire and somewhat callose-thickened at the median apex, glabrous on both surfaces. Petals 6, glabrous, 1.7–1.9 × 1.6–1.8 cm, white, obovate, apically rounded, entire. Stamens 12, isomorphic; filaments 6 mm long, complanate, glabrous and somewhat declined to one side of the flower opposing the style; anthers free, 4–5 mm long, 1–1.5 mm wide, yellow, oblong, laterally compressed with two well-separated pores at the rounded-truncate apex; connective dilated dorso-basally ca. 0.5 mm above the filament insertion into a blunt appendage. Ovary 6-celled, glabrous at the slightly elevated bluntly conic apex but lacking a collar. Style erect and somewhat incurved distally, glabrous, 1.1–1.3 cm long, the expanded stigma subtruncate to broadly



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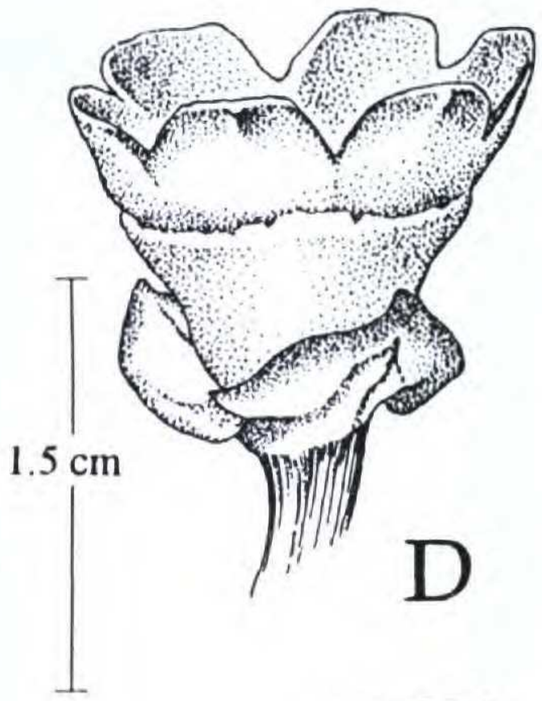

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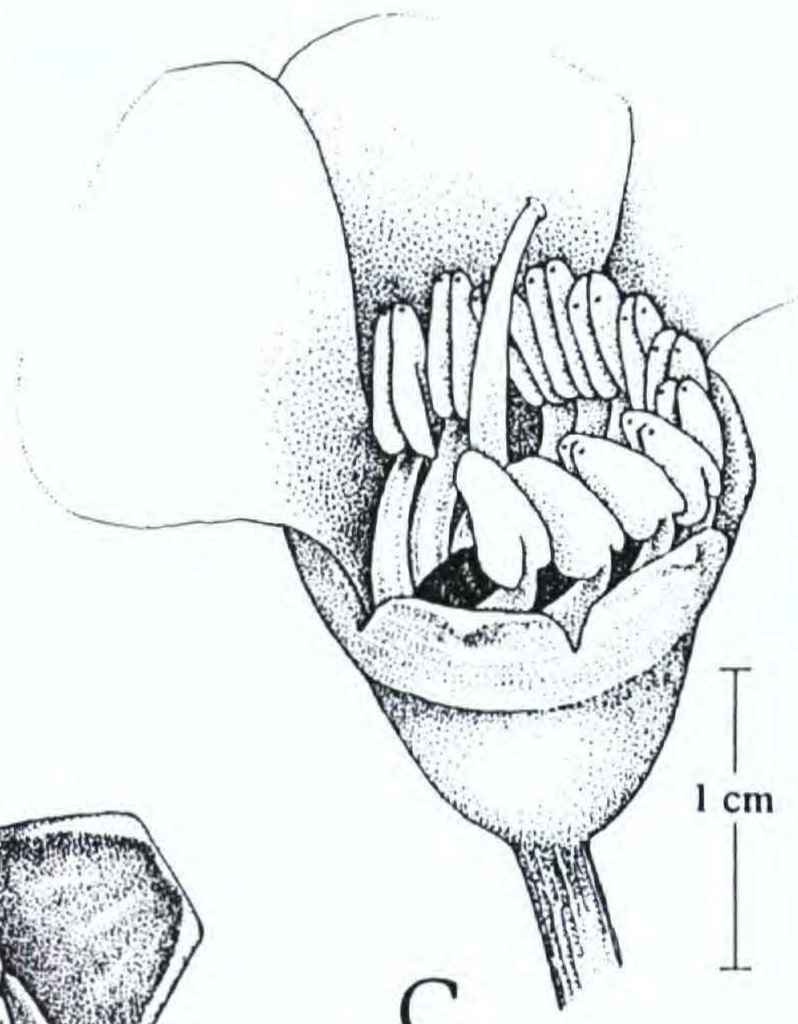

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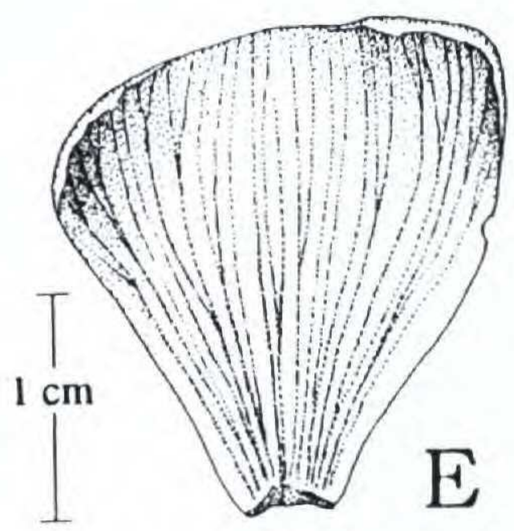

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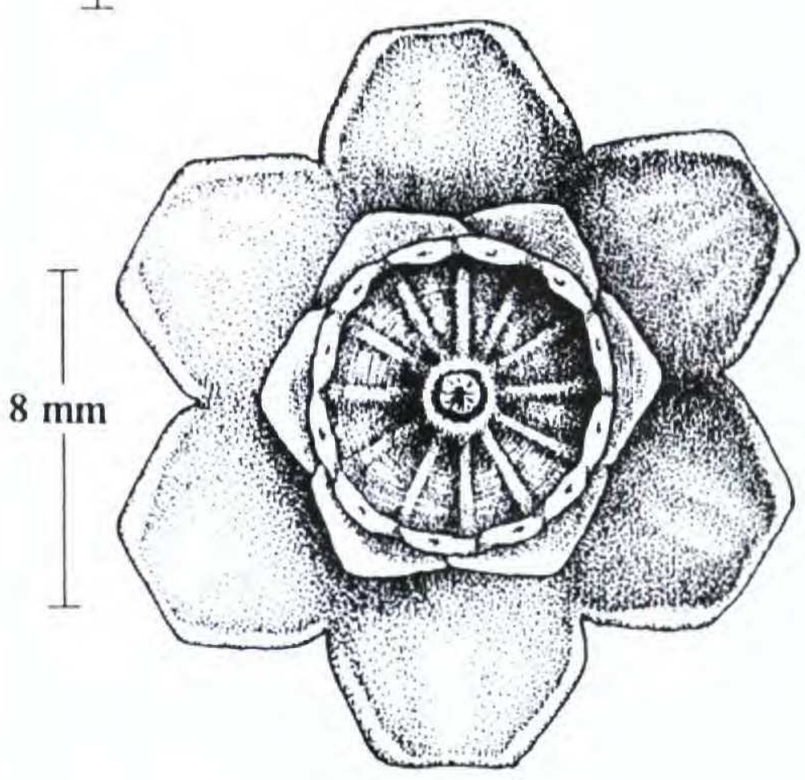

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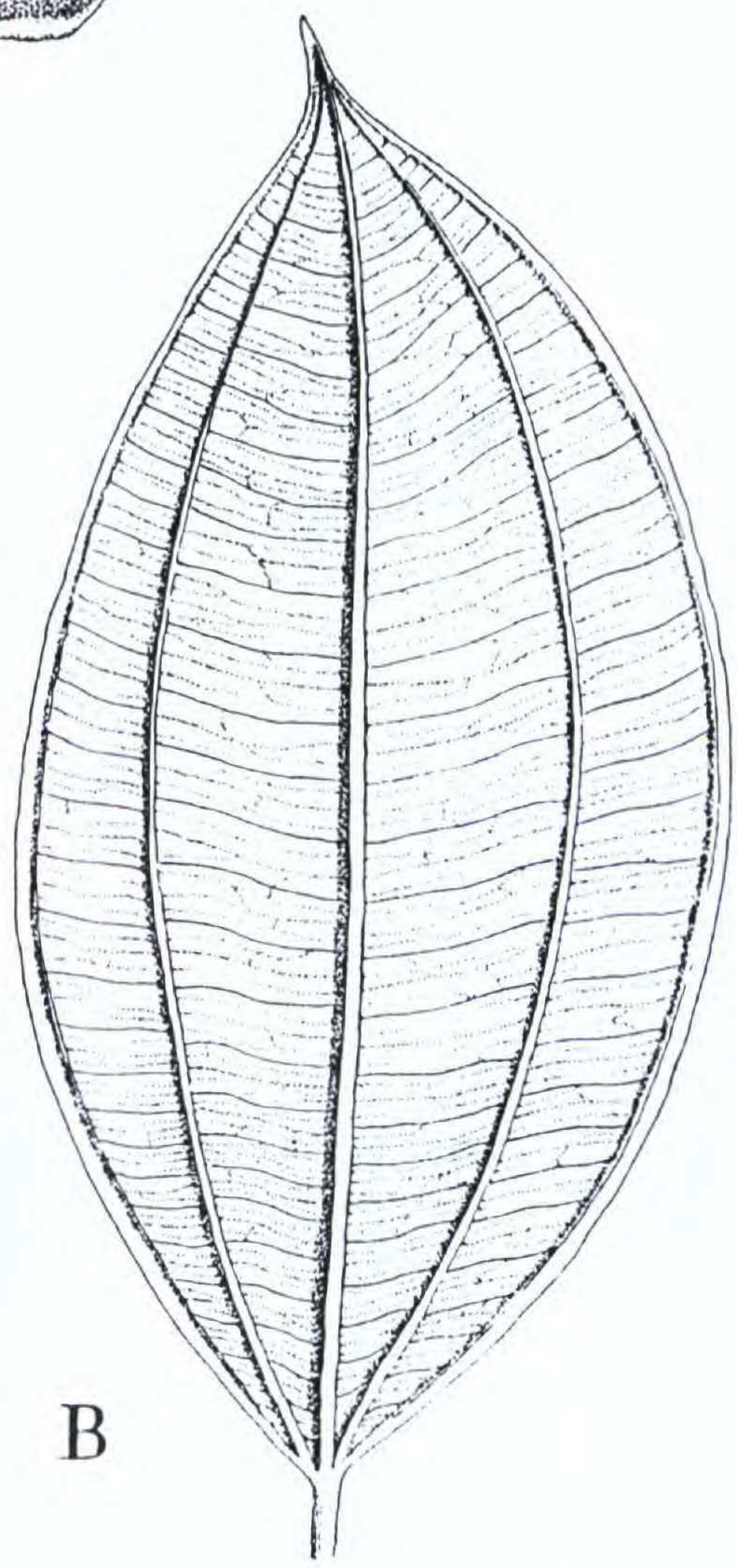

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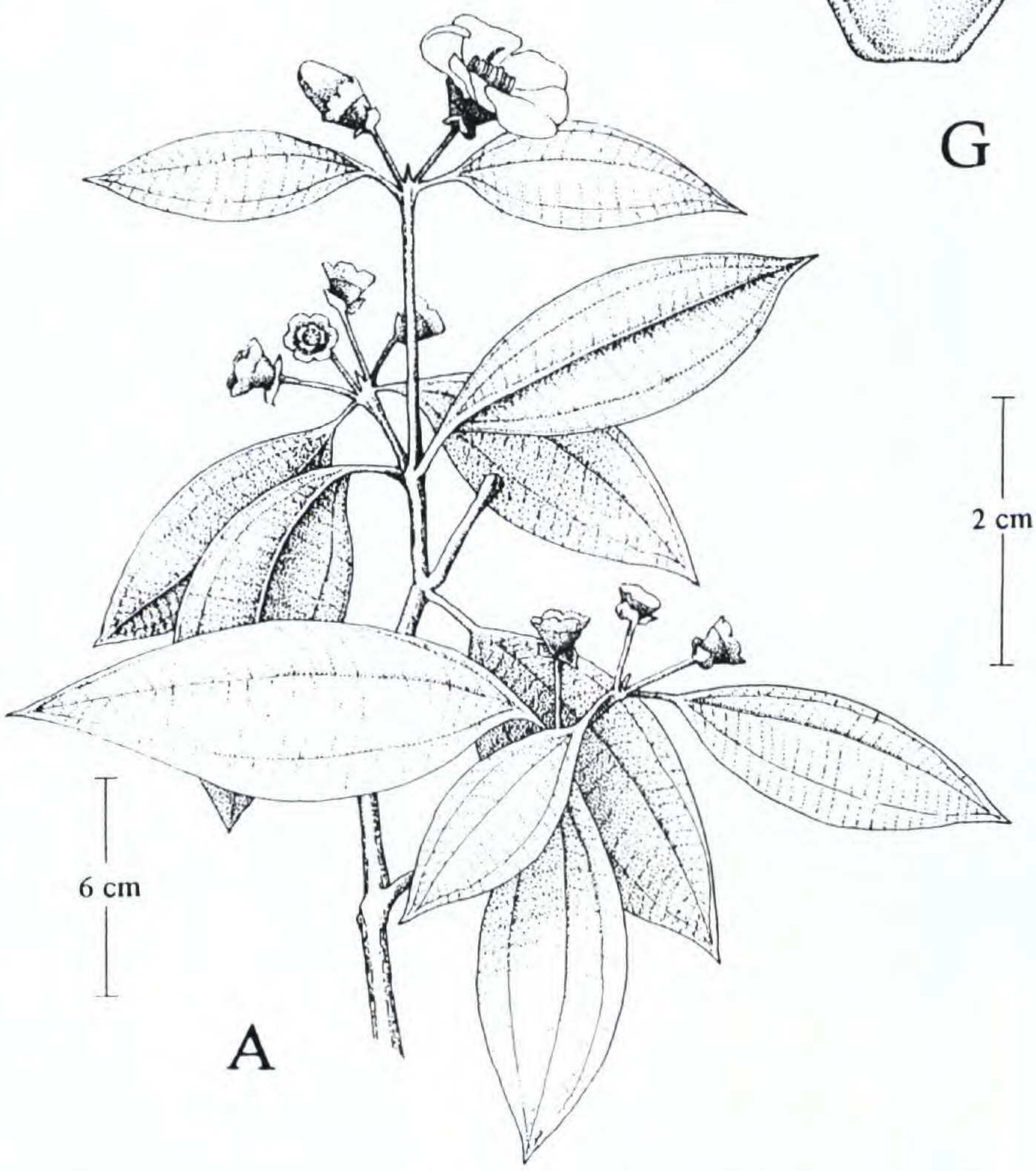


A

Figure 1. *Blakea coloradensis* Almeda. —A. Habit. —B. Representative leaf (abaxial surface). —C. Open flower with several petals and outer bracts removed. —D. Hypanthium and floral bracts with petals, androecium, and style removed. —E. Petal (adaxial surface). —F. Stamens, ventral view (left), lateral view (right). —G. Hypanthium (top view) showing ovary summit, torus, and calyx lobes. (A–G from *Almeda et al. 6417.*)

rounded. Berry subglobose, 1 × 1 cm. Seeds beige, mostly 1 mm long.

Distribution and phenology. A little-collected cloud forest species presently known from the Pacific slope of Cerro Colorado, Panama, at 1390–1450 m. Collected in flower in January, in fruit in July.

Blakea coloradensis is unique among its Mesoamerican congeners in having outer floral bracts that are widely spreading to form a saucer-like structure at the base of the hypanthium. The pronounced spreading posture of the outer floral bracts exposes the completely fused inner floral bracts in a way that is never seen in other members of the genus with well-developed foliaceous outer bracts. This distinctive bracteal feature coupled with the short hypanthium (5–7 mm long), comparatively narrow leaves (3.2–5.8 cm wide), and small petals (1.7–1.9 × 1.6–1.8 cm) readily sets *B. coloradensis* apart from all other members of the genus.

In having dorsally appendiculate anthers and inner floral bracts that are completely fused to form an apically truncate, cupulate collar that tightly envelops the hypanthium, *B. coloradensis* is most similar to *B. storkii* of Costa Rica and Panama. Plants of the latter species are invariably coarser with outer floral bracts that are fused for half or more of their length to form a cup that closely envelops the inner bracts and hypanthium, the hypanthium proper is longer (1.2–1.9 cm), and the petals are modally larger (2–4.2 × 1.5–2.9 cm). Since *B. coloradensis* appears to be a local endemic with a limited elevational range, it is tempting to suggest that it was derived from an allopatric relative like *B. storkii*, which occurs at mostly higher elevations (1500–2636 m) from Cerro Pate Macho in western Panama northwestward to the Cordillera Central of Costa Rica.

Paratype. PANAMA. **Chiriquí:** Cerro Colorado, along road to copper mine, 34.1 km beyond bridge over Río San Felix near town of San Felix, 13.1 km beyond turnoff to Escopeta, 15 July 1976 (fr), *Croat 37300* (MO).

7. **Blakea costaricensis** Umaña & Almeda, Selbyana 12: 1. 1991. TYPE: Costa Rica. Limón: Valle de Estrella, Fila Matama, El Progreso, 1600 m, 24 Apr. 1989, *Herrera & Chacón 2758* (holotype, CR; isotypes, CAS, COL, F, K, MEXU, MO, QCNE, US, USJ, WIS).

Distribution and phenology. This little-collected endemic of Costa Rica appears to be restricted to the Caribbean slopes of the Cordillera de Talamanca in montane forests at 1300–1600 m. Flowering collections have been made in April; fruiting collections are unknown.

Among Mesoamerican species of *Blakea*, this species is unusual in having large flowers that measure 10–11 cm across when fresh, a calyptriform calyx, and floral bracts that are 6-lobed and reminiscent of a typical calyx. *Correa & Montenegro 10169* and *McPherson 7926* (both at CAS) from Parque Nacional Altos de Campana, Panama, are reminiscent of *B. costaricensis* in having thick coriaceous leaves and a calyptriform calyx. Field observations and additional study of the Panama plants are needed to determine whether they are conspecific with *B. costaricensis*.

8. **Blakea crinita** Gleason, Phytologia 3: 356. 1950. TYPE: Panama. Coclé: crest of Cerro Pajita, *Allen 3956* (holotype, NY; isotypes, BM, MO).

Distribution and phenology. This little-collected species is known only from cloud forest habitats on Cerros Pajita and Gaital in the vicinity of El Valle de Antón, Panama, at 900–1400 m. Collected in flower from November through January, in very young fruit in February, July, and November.

In the protologue of this species, Gleason stated that he could not satisfactorily determine the structure of the hypanthium and involucre (floral bracts) because of the dense hair covering. This species was known to him only from the type. Two of the five additional collections examined for this treatment each have a single open flower and none has mature fruits, so a thorough analysis of the reproductive characters in this species is still needed. *Blakea crinita* is unusual in having a combination of essentially sessile flowers, laterally connate anthers, and a calyx that ruptures at anthesis in two to six deciduous lobes. On fruiting hypanthia, remnants of the calyx form a tubelike flange.

9. **Blakea cuatrecasii** Gleason, Bull. Torrey Bot. Club 72: 387. 1945. TYPE: Colombia. Valle: Cordillera Occidental, 900–1180 m, *Cuatrecasas 15180* (holotype, NY; isotypes, CAS, F, US).

Distribution and phenology. Localized in central and eastern Panama where it is known from cloud forests on Cerros Jefe, Mali, Sapo, and Pirre extending to western Colombia at 650–1500 m. Collected in flower and fruit sporadically throughout the year.

This species exhibits much variation in leaf shape and the size and degree of fusion of the outer floral bracts, but none of the differences can be

correlated with geography or other characters. The recognition of a single taxonomic entity seems warranted in view of interpopulational homogeneity with respect to the lepidote indument on abaxial foliar surfaces, semicircular floral bracts, bicolored petals (white with red-pink apical band abaxially), and pseudoterminal position of the anther appendages.

10. Blakea cuneata Standley, Publ. Carnegie Inst. Wash. 461: 76. 1936. TYPE: Belize. Petén: Río Viejo, Camp 32, 20 Nov. 1933, *Schipp S-604* (holotype, F).

Blakea bella Standley, Field Mus. Nat. Hist., Bot. Ser. 22: 94. 1940. Syn. nov. TYPE: Guatemala. Izabal: bank of Río Dulce, 28 Mar. 1939, *Wilson 402* (holotype, F).

Distribution and phenology. Local in rainforests from Belize to Guatemala and Honduras at 250–1140 m. Collected in flower during September and October, in fruit during April and May.

The only character used to distinguish *B. cuneata* and *B. bella* in the past has been petal length (Standley & Williams, 1963). Petal size for the former was reported as 1.5 cm long in the protologue, whereas that of the latter was given as 3 cm long. Petals on the holotype of *B. bella* are in fact only 2–2.5 cm long. All other specimens attributable to this complex have petals ranging in length from 1.5 to 2.5 cm. Because these two species are otherwise identical or exhibit comparable patterns of size variation in all other features, there appears to be no sound basis for the continued recognition of two taxa. I herein relegate *B. bella* to the synonymy of *B. cuneata.*

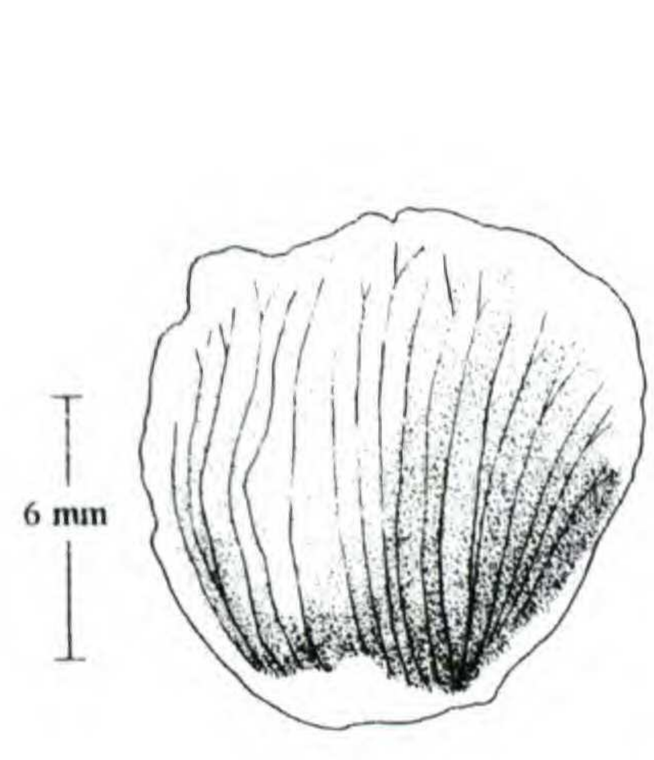
11. Blakea darcyana Almeda, sp. nov. TYPE: Panama. Chiriquí: Fortuna Dam area, N of reservoir, ridge along Continental Divide and southward from Quebrada de Arena, 1100–1500 m, Aug. 1984, *W. G. D'Arcy & C. Todzia 15958* (holotype, CAS; isotypes, MO, US). Figure 2.

Frutex. Petioli 1.1–2.1 cm longi; lamina 4.9–7.7 cm obovata apice caudata basi acuta vel acuminata ad maturitatem coriacea et glabra, 3–5-nervata, nervi in axillis acarodomatiis instructi, nervis secundariis 0.25 mm inter se distantibus. Flores 6-meri in quoque nodo superiore singuli, peduncularis 0.9–1.2 cm longis; bracteae exteriores 1.1–1.3 × 1.1–1.2 cm ovatae vel ovato-ellipticae, ad basim paulo (1 mm) coalitae vel omnino liberae; bracteae interiores 1–1.2 × 1–1.4 cm obovatae, omnino liberae. Hypanthium (ad torum) 0.6 cm longum; calycis tubus 4 mm longus, lobis paullulo 6-undulatus. Petala 12–13 × 13.5–17 mm ovata apice rotundato vel undulato. Antherae 4.5–5 × 3–3.5 mm inter se lateraliter non cohaerentes apice minute biporosae; connectivum ad basim dorsaliter dente 0.25 mm descendenti armatum. Ovarium 6-loculare, cono glabro (collo non evoluto).

Shrub. Upper branchlets terete to rounded-quadrate and glabrous with thickened interpetiolar lines or ridges. Mature leaves of a pair equal or nearly so, glabrous on both surfaces; petioles 1.1–2.1 cm long; blades coriaceous when dry, 4.9–7.7 cm long and 3–4.5 cm wide, obovate, apex caudate, base acute to acuminate, margin entire, 3- to 5-nerved with inconspicuous but well-developed, irregularly ruptured domatia formed at the abaxial blade base in the angles between the median vein and each of the two proximal lateral veins, the striolate transverse secondary veins spaced 0.25 mm apart or less at the widest portion of the blade. Flowers erect, solitary in the uppermost leaf axils and appearing pseudoterminal; peduncles 0.9–1.2 cm long, somewhat compressed laterally when dry, glabrous throughout. Floral bracts sessile, entire and glabrous throughout; outer bracts 1.1–1.3 × 1.1–1.2 cm, free or fused basally for 1 mm at anthesis, ovate to elliptic-ovate, apex bluntly short-acuminate; inner bracts 1.1–1.2 × 1–1.4 cm, free, obovate, apex rounded. Hypanthium campanulate to suburceolate, 0.6 cm long to the torus and 0.6 cm diam., glabrous. Calyx 4 mm long from the torus, flangelike and involute, the lobes merely depressed undulations with inconspicuous callose thickenings at the median abaxial apex, glabrous on both surfaces. Petals 6, glabrous, 12–13 × 13.5–17 mm, white flushed with pink, depressed-ovate to suborbicular, apically rounded to gently undulate, entire. Stamens 12, isomorphic, filaments 5–8 mm long, complanate and glabrous; anthers free, 4.5–5 mm long, 3–3.5 mm wide on the lateral face, probably yellow, ellipsoid in profile view, laterally compressed with two well-separated pores at the apex; connective thickened and dilated dorso-basally into a blunt deflexed appendage less than 0.25 mm long about 1 mm above the base of the anther thecae. Ovary 6-celled, glabrous at the elevated conelike apex. Style glabrous, 6–7 mm long; stigma punctiform. Mature berry and seeds not seen.

Distribution and phenology. Known only from the type collection made in western Panama.

Blakea darcyana is distinguished by its glabrous, apically caudate leaves, finely striolate foliar venation, foliaceous floral bracts that conceal the hypanthium, flangelike involute calyx tube, and dorso-basally appendiculate anther connective. Another distinctive, but readily overlooked, diagnostic feature of this species is the domatia (most evident when ruptured) at the abaxial blade base



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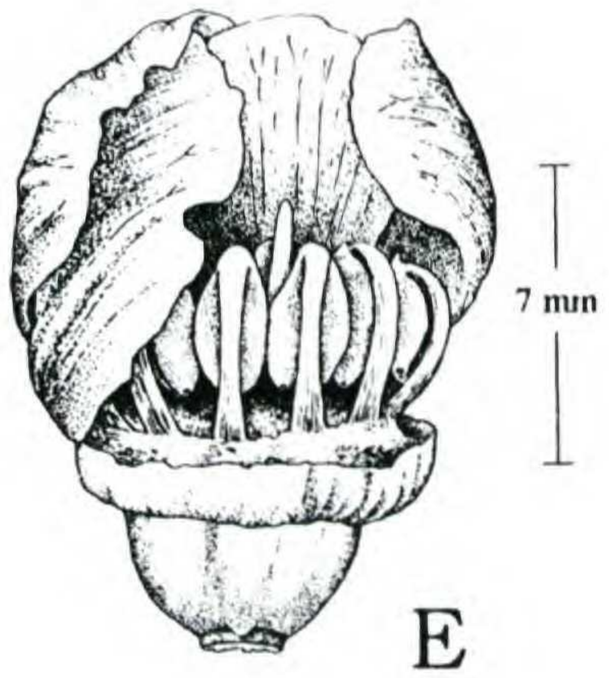

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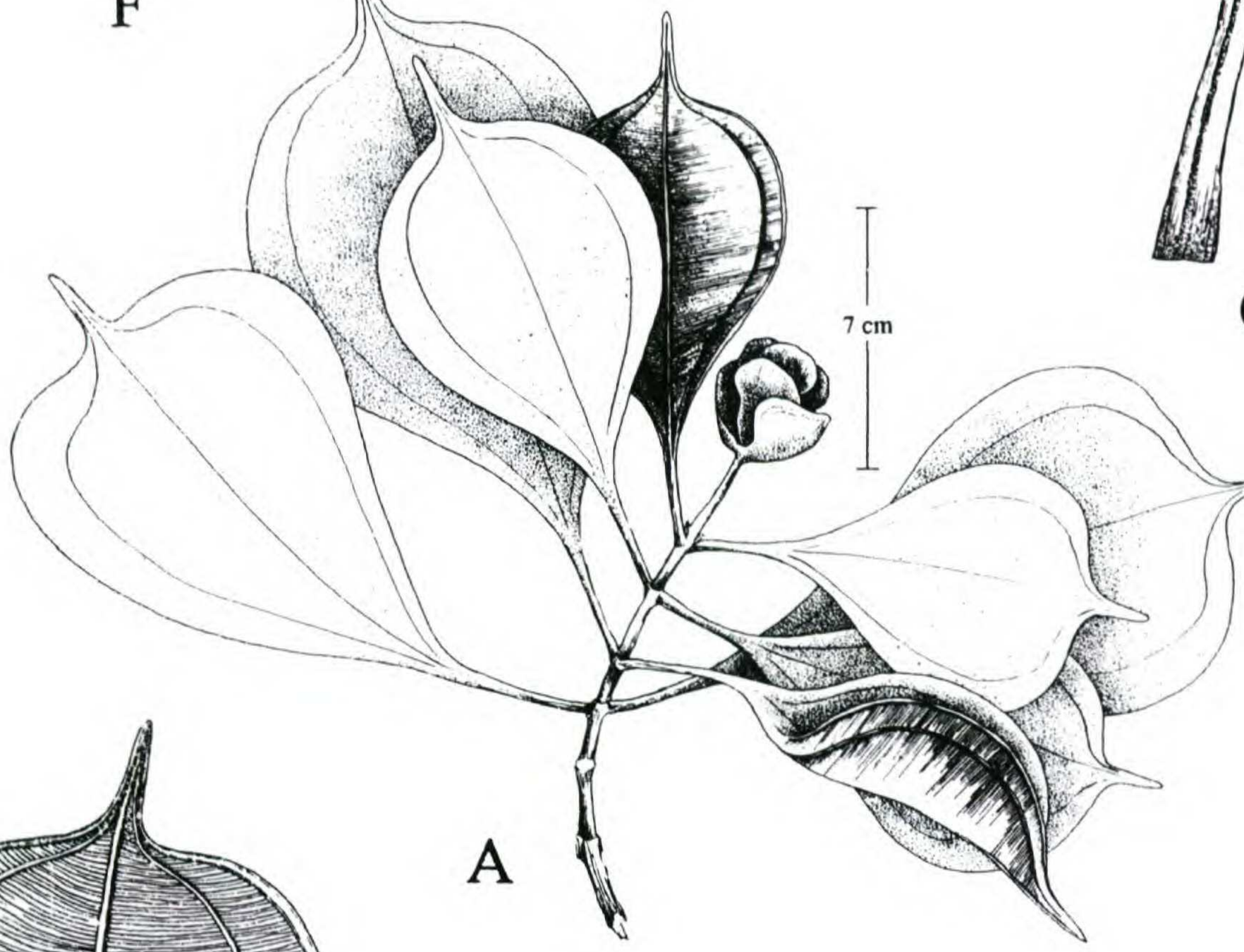

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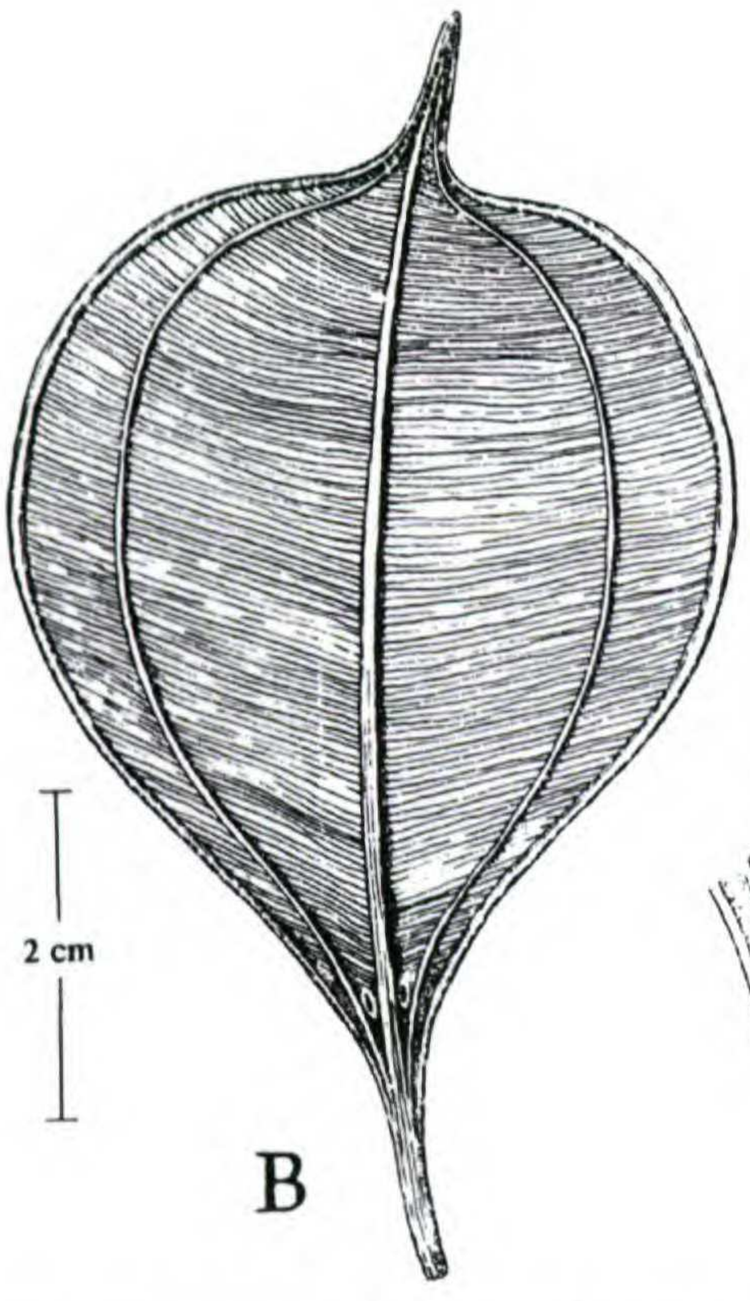

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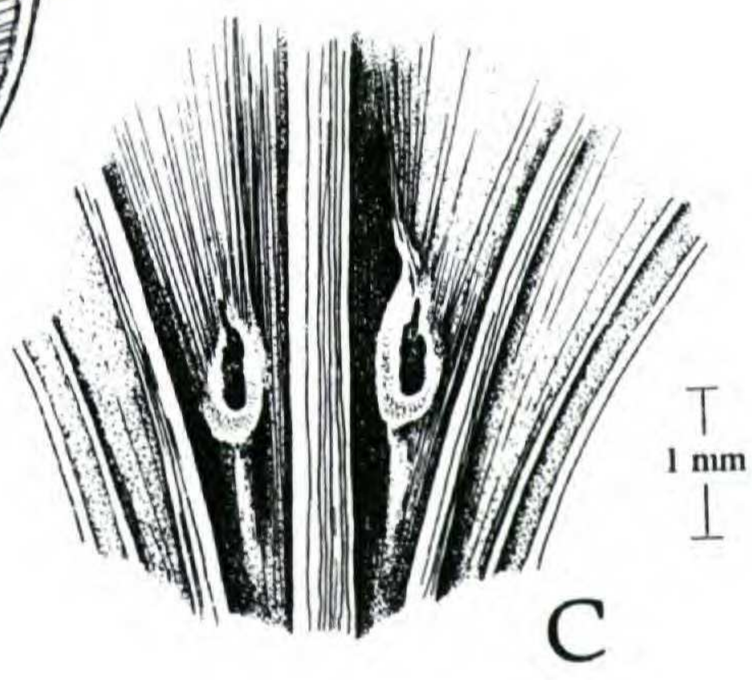

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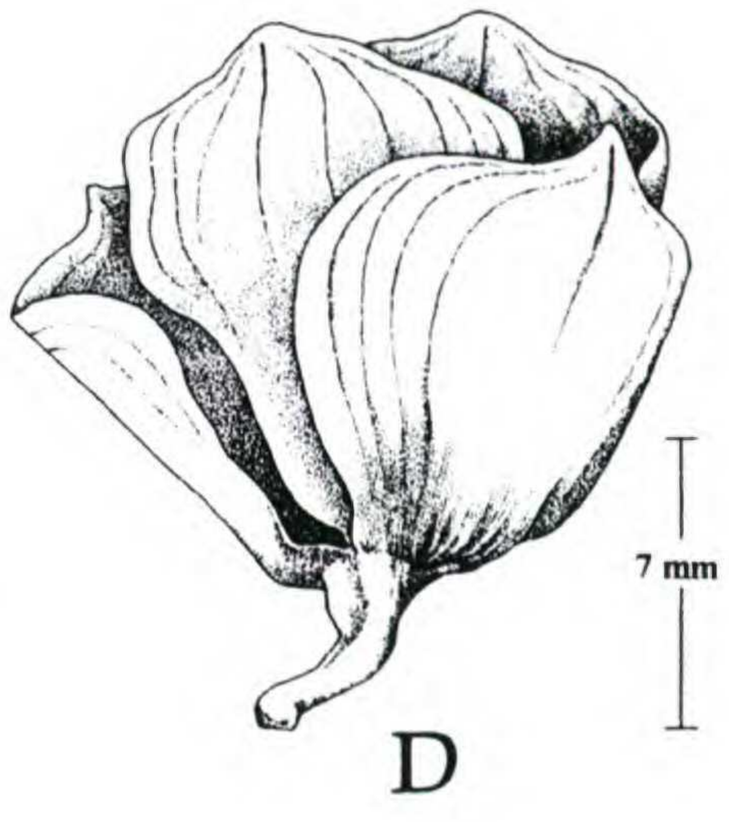

D

Figure 2. *Blakea darcyana* Almeda. —A. Habit. —B. Representative leaf (abaxial surface). —C. Leaf base (abaxial surface) showing perforated domatia. —D. Flower bud enveloped and concealed by outer and inner bracts. —E. Flower in pre-anthesis with three petals removed. —F. Petal (adaxial surface). —G. Stamen, lateral view. (A–G from *D'Arcy & Todzia 15958.*)

in the angles between the median vein and each of the two proximal lateral veins (Fig. 2C). Vegetatively, *B. darcyana* is reminiscent of some of the broader-leaved populations of *B. herrerae* Almeda, another Panama endemic. The latter, however, has greatly reduced floral bracts that do not conceal the hypanthia, pale greenish white petals, and laterally connate anther thecae; it lacks foliar domatia. *Blakea gracilis* is the only other species with which *B. darcyana* might be confused because of its large foliaceous floral bracts and unlobed flangelike calyx. It differs consistently from the new species in its laterally connate anther thecae, longer floral peduncles (2.1–4.2 cm), hypanthia that are costulate in post-anthesis, and lack of foliar domatia.

The label on the type describes *B. darcyana* as a shrub. More collections and additional field observations may show that it is often epiphytic like so many members of the genus that occur in the perpetually wet cloud forest covering the slopes and valleys of the Fortuna region of western Panama.

This species is named for William G. D'Arcy (1931–1999), collector of the type and long-time student of the Solanaceae and the neotropical flora, in recognition of his many contributions to understanding the rich and diverse flora of Panama.

12. Blakea elliptica (Gleason) Almeda, Proc. Calif. Acad. Sci. 43: 270. 1984. *Topobea elliptica* Gleason, Phytologia 3: 353. 1950. TYPE: Panama. Bocas del Toro: N slopes of Cerro Horqueta, 6000–7000 ft., 5–7 Aug. 1947, *Allen 5001* (holotype, MO).

Distribution and phenology. Uncommon in cloud forests, elfin forests, and windswept ridges from the Fortuna region to the vicinity of Cerro Horqueta in western Panama at 1800–2100 m. Collected in flower from January through March, September, and December, in fruit from February through May.

This is one of the most distinctive Central American species of *Blakea* because of its sessile clasping leaves and deciduous indument of spreading glandular and blunt conic hairs on distal branchlets, pedicels, floral bracts, and vegetative buds.

13. Blakea foliacea Gleason, Phytologia 3: 355. 1950. TYPE: Panama. Bocas del Toro: vicinity of Chiriquí Lagoon, 14 Apr. 1941, *von Wedel 2219* (holotype, NY; isotype, US).

Distribution and phenology. Cloud forests and rainforests in Costa Rica where it is uncommon and Panama where it is locally very common at 250–1200(–2000) m. Collected in flower and fruit throughout the year.

The diagnostic features of *B. foliacea* include the inconspicuous abaxial foliar domatia, free foliaceous floral bracts, and laterally connate anthers.

Variation in pubescence quantity and the size and shape of floral bracts is considerable in this species. None of the extremes involving either character can be correlated with other differences. The most pubescent populations occur on Cerro Colorado and in the Fortuna region of western Panama, but even these extremes are sufficiently diverse in other characters to preclude recognition of geographically meaningful taxa. Floral bract size and shape also vary independently of other characters throughout the range of this species.

14. Blakea fuchsioides Almeda, Proc. Calif. Acad. Sci. 46: 137. 1989. TYPE. Panama. Chiriquí: La Fortuna area, ca. 7 mi. N of Los Planes de Hornito, 1097 m, 26 Aug. 1983, *Hammel & Kress 13473* (holotype, CAS; isotype, DUKE).

Distribution and phenology. Endemic to cloud forests of western Panama at 1050–1650 m. Collected in flower in January, in fruit in March.

This is a striking species with showy pendent flowers that are reminiscent of *Fuchsia* in their pendent posture and two-toned coloration. Although field observations of open flowers are still lacking, I strongly suspect that this species produces floral nectar because it otherwise has all the earmarks of a hummingbird-pollinated flower (Almeda, 1989; Proctor et al., 1996).

15. Blakea gracilis Hemsley, Diag. Plant. Nov. 1: 13. 1878. TYPE: Costa Rica. *Endres 248* (holotype, K).

Distribution and phenology. Locally common in cloud forests from Nicaragua to Panama at 1200–2300 m. Collected in flower from September through April, in fruit from November through July.

This species and *B. litoralis* L. O. Williams, which are very similar vegetatively, are commonly confused. *Blakea gracilis* has bright yellow anthers, white petals with a flush of pink on the abaxial margins, and an ovary that is somewhat to markedly costulate in post anthesis. In *B. litoralis*, the anthers are pink or very pale yellow-white, the petals are pink, and the ovary (even when immature) is terete and smooth. In *B. gracilis* the anthers are rounded apically, whereas in *B. litoralis* they are bluntly obconic apically. These two species also appear to have modally different elevational distri-

butions. *Blakea litoralis* grows at lower elevations (0–1000 m) rarely extending to 1250 m, whereas *B. gracilis* prefers higher elevations (1200–2200 m).

16. Blakea grandiflora Hemsley, Diag. Plant. Nov. 1: 13. 1878. TYPE: Costa Rica. *Endres 230* (holotype, K).

Blakea pittieri Cogniaux, DC. Monogr. Phan. 7: 1080. 1891. Syn. nov. TYPE: Costa Rica, La Palma, 1550 m, *Pittier 697* (holotype, BR).

Distribution and phenology. Endemic to Costa Rica where it is locally common on cloud forest slopes of the Cordillera de Tilarán, Cordillera Central, and Cordillera de Talamanca at (950–)1500–2500 m. Collected in flower and fruit from July through January.

This species is variable in habit, foliar size, and indument abundance. In some populations all individuals are free-standing trees. In others, all plants encountered are epiphytic shrubs. In foliar size, some individuals have uniformly small leaves (8–9.5 × 3–6 cm) whereas others have much larger leaves (14–26 × 8–13.5 cm). The holotype of *B. grandiflora*, the older name for this species, constitutes the glabrous extreme, whereas the holotype of *B. pittieri* represents a population of the more pubescent variant. These variants are connected by a range of intermediates that makes assignment of all but the extremes difficult and arbitrary. Because all of the populations in this complex are very similar in vegetative and reproductive characters, the recognition of a single taxonomic entity appears to be the most prudent and defensible disposition based on available data.

17. Blakea gregii Almeda, Proc. Calif. Acad. Sci. 46: 305. 1990. TYPE: Panama. Chiriquí: Cerro Pate Macho, 2100 m, 17 Jan. 1986, *G. de Nevers & G. McPherson 6840* (holotype, CAS; isotypes, MEXU, MO, PMA, US).

Distribution and phenology. Endemic to a small area of western Panama extending from Cerro Horqueta to Cerro Pate Macho in cloud forest or elfin forest at 1800–2200 m. Collected in flower in January, in fruit in March. It is known from fewer than five collections.

Blakea gregii differs from the other four green-flowered species of *Blakea* in having uppermost internodes and elevated primary veins on abaxial leaf surfaces that are densely covered with appressed brown hairs 1–2.5 mm long, leaves that lack the saccate pseudoformicarial pouches at the petiole-laminar junction, and outer and inner floral bracts that are shorter than the combined length of the hypanthium and calyx lobes.

18. Blakea guatemalensis Donnell Smith, Bot. Gaz. 14: 25. 1889. TYPE: Guatemala. Alta Verapaz, Pansamala, 3800 ft., Sep. 1886, *von Tuerckheim 778* (holotype, US; isotypes, BR, K).

Blakea subpeltata Cogniaux, DC. Monogr. Phan. 7: 1075. 1891. Syn. nov. TYPE: Costa Rica. Turrialba, *Oersted 8* (holotype, C not seen; isotype, BR).

Distribution and phenology. Local and uncommon in Guatemala with disjunct populations in Costa Rica and Panama in rainforests and cloud forests at 50–1600(–2000) m. Collected in flower from October through April, in fruit from January through July.

The distinctive characters of *B. guatemalensis* include its pronounced foliar dimorphism at each node, subpeltate leaf blades, completely free floral bracts, and laterally connate anthers with connectives that are keeled dorsally and modified dorsobasally into a deflexed spurlike appendage.

When Cogniaux described *B. subpeltata* from Costa Rica he did not compare it with *B. guatemalensis* nor did he provide any comments on its affinities. It is difficult to know what led him to recognize the Guatemalan and Costa Rican populations as distinct taxa because they are similar in all details. The holotype of *B. guatemalensis* appears to be an extreme variant in having somewhat longer floral peduncles than all other collections seen from Guatemala or Costa Rica. Because these two taxa are otherwise indistinguishable in all vegetative and reproductive features, I consider them to be conspecific. *Carrasquilla 2049* (US) from Panama is the first and only known record from that country.

19. Blakea hammelii Almeda, Proc. Calif. Acad. Sci. 46: 309. 1990. TYPE: Panama. Chiriquí: 3.5 mi. NE of Boquete, end of road on slope S of Río Palo Alto, 17 Nov. 1978, *Hammel 5688* (holotype, CAS; isotype, MO).

Distribution and phenology. Known only from the slopes of Cerro Pate Macho and along the Río Palo Alto in western Panama where it is local and uncommon in cloud forests at 1600–1900 m. Collected in flower in January, March through April, and November, in fruit from January through April.

Vegetatively, *Blakea hammelii* resembles *B. pauciflora*, but it is readily distinguished by the following combination of characters: leaf blades that are caudate to cuspidate apically, greatly reduced floral bracts (3–5 × 2–3.5 mm), well-developed broadly ovate calyx lobes, and free anther thecae.

20. Blakea herrerae Almeda, Proc. Calif. Acad. Sci. 46: 311. 1990. TYPE: Panama. Comarca de San Blas: El Llano–Cartí road at about km 19, Ina Igar trail in the vicinity of Nusagandi, 350 m, 1 Feb. 1989, *Almeda et al. 6507* (holotype, CAS; isotypes, AAU, BM, BR, CR, DUKE, F, G, MA, MEXU, MICH, MO, NY, P, PMA, TEX, US, WIS).

Distribution and phenology. Low rainforests from the Caribbean slope of central Panama (Coclé) east to the Nusagandi region (Comarca de San Blas) at 100–400 m. Flowering and fruiting sporadically throughout the year.

Blakea herrerae has flowers that are erect at anthesis with greenish white more or less translucent petals, free floral bracts, and unappendaged laterally connate anther thecae.

21. Blakea litoralis L. O. Williams, Fieldiana, Bot. 31: 34. 1964. TYPE: Costa Rica. Puntarenas: vicinity of Esquinas Experiment Station, Golfo Dulce area, sea level, 30 Sep. 1949, *Allen 5329* (holotype, F; isotypes, F, K, US).

Blakea florida L. O. Williams, Fieldiana, Bot. 31: 33. 1964. Syn. nov. TYPE: Costa Rica. Guanacaste: 5 km E of Tilarán above Laguna de Arenal, 900–1000 m, 13 Feb. 1963, *Williams & Williams 25099* (holotype, F; isotypes, NY, US).

Blakea gracilis Hemsley var. *longifolia* Cogniaux, Bull. Soc. Roy. Bot. Belgique 30: 266. 1891. Syn. nov. TYPE: Costa Rica. Entre le General et le Río San Pedro, *Tonduz 3764* (holotype, BR).

Distribution and phenology. Essentially restricted to Costa Rica with one collection known from the El Valle region of Panama in rainforests and low cloud forests at sea level to 1000(–1250) m. Collected in flower from August through April, in fruit from February through April.

This species and *B. florida*, which were described on consecutive pages of the same publication, are identical in all vegetative and fruit characters and I consider them conspecific. I adopt the name *B. litoralis* for this species and relegate *B. florida* to synonymy because the type of the former has good flowers, whereas the type of the latter lacks petals and stamens. For diagnostic differences between *B. litoralis* and its presumed closest relative, *B. gracilis*, see the discussion following the latter species.

22. Blakea pauciflora Gleason, Phytologia 3: 357. 1950. TYPE: Panama. Chiriquí: Sierra del Boquete, *Maurice 744* (holotype, NY; isotype, US).

Distribution and phenology. Endemic to Costa Rica and Panama where it is locally common in rainforests and cloud forests at 700–1800(–2100) m. Collected in flower and fruit throughout the year.

The species is recognized with ease because the calyx tube is spreading and flangelike, and the calyx lobes are obsolete or evident as broadly depressed deltoid undulations with blunt callose-thickened teeth abaxially.

23. Blakea penduliflora Almeda, Brittonia 32: 508. 1981. TYPE: Costa Rica. Heredia: SW flanks of Volcán Barva above Sacramento in the vicinity of Laguna Barva, 2700 m, 28 July 1977, *Almeda et al. 3284* (holotype, CAS; isotype, F).

Distribution and phenology. Endemic to Costa Rica where it is local and uncommon in cloud forests of the Cordillera Central and Cordillera de Talamanca at 2400–2700 m.

Among the pendent-flowered species with green petals, *B. penduliflora* stands out by virtue of its essentially glabrous but conspicuously lenticellate floral peduncles and its glabrous apically obtuse to rounded outer floral bracts.

24. Blakea perforata Almeda, sp. nov. TYPE: Panama. Panamá: area surrounding Rancho Chorro, Cañazas mountains above Tortí Arriba, 400–700 m, 3 Dec. 1977, *J. Folsom et al. 6740* (holotype, CAS; isotype, MO). Figure 3.

Frutex epiphyticus. Ramuli paulo nodosi rotundato-quadrangulati demum teretes ad nodos perforati. Petioli 2–4 cm longi; lamina 8.3–16.5 × 4–8 cm elliptica apice acuminato vel caudato-acuminato basi acuta, 5-plinervata, nervis secundariis 1.5–2.5 mm inter se distantibus. Flores 6-meri in quoque nodo superiore 1–2, pedunculares 2–3 cm longis; bracteae exteriores 1.9–2.2 × 1.3–1.6 cm ovato-ellipticae, ad basim 1.3–1.6 cm coalitae; bracteae interiores 1.4–1.6 × 1.3–1.5 cm ca. 7–8 mm coalitae. Hypanthium (ad torum) 1 cm longum; calycis tubus 4–5 mm longus, lobis 2–3 mm longis. Petala 2.1–2.3 × 1.8–1.9 cm ovata vel obovata apice rotundato. Antherae 4–5 × 1.5–2 mm inter se lateraliter non cohaerentes apice minute biporosae; connectivum nec prolongatum nec appendiculatum. Ovarium 6-loculare, apice glabro (cono et collo non evoluto).

Epiphytic shrub. Upper branchlets rounded-quadrate and glabrous with swollen nodes often bearing small holes 1–2 mm diam. that lead to domatia presumably occupied by ants. Vegetative buds copiously covered with a caducous mixture of finely barbed coarse subulate hairs and bifid or dendritic hairs. Mature leaves of a pair equal to somewhat unequal in size, adaxially glabrous, abaxially irregularly white-puncticulate on the ac-

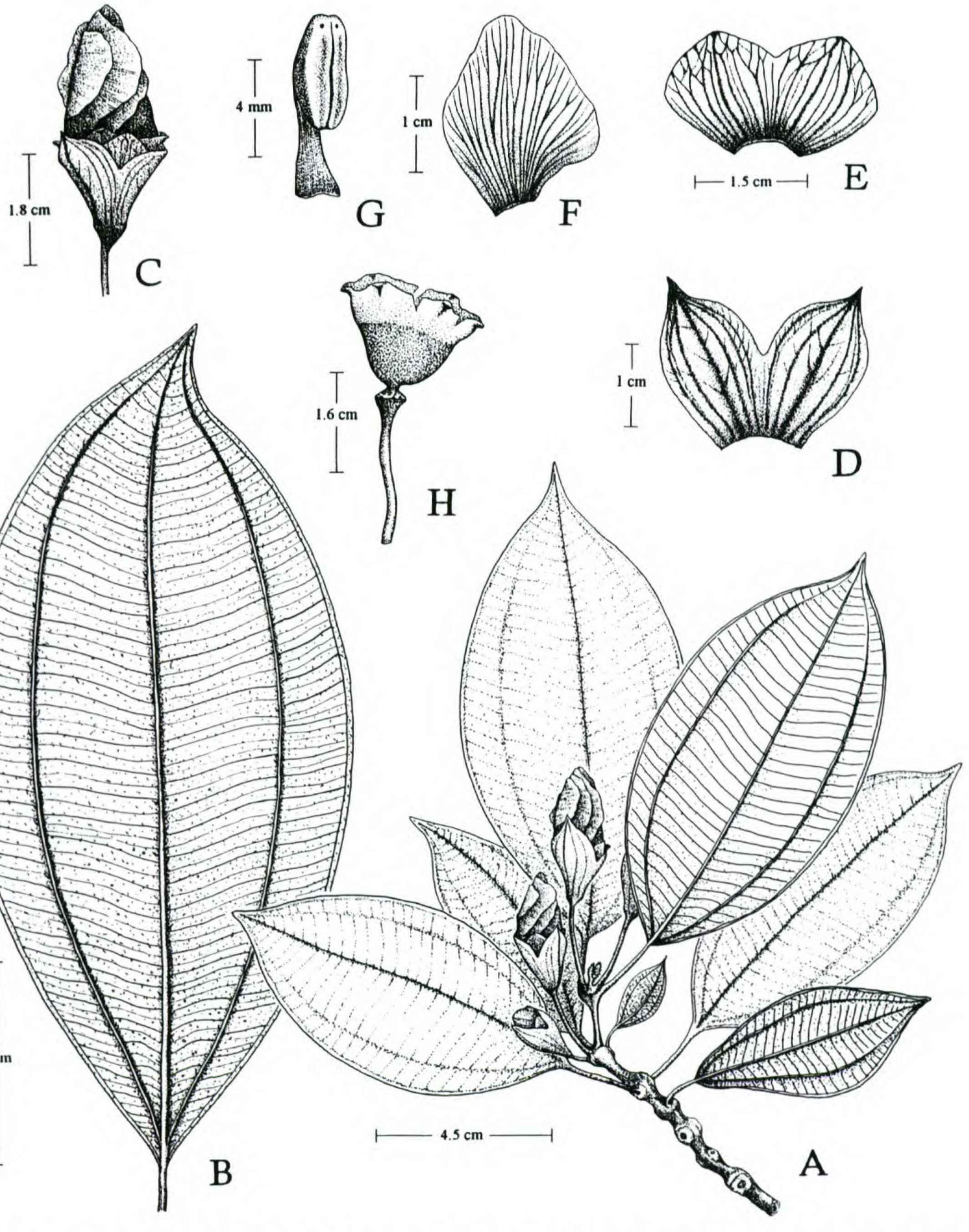

Figure 3. *Blakea perforata* Almeda. —A. Habit. —B. Representative leaf (abaxial surface). —C. Floral bud at pre-anthesis. —D. Outer floral bracts removed from hypanthium, cut longitudinally, and spread apart in a single plane. —E. Inner floral bracts removed from hypanthium, cut longitudinally, and spread apart in a single plane. —F. petal (adaxial surface). —G. Stamen (ventral view). —H. Hypanthium with floral bracts and all other floral parts removed. (A–H from *Folsom et al. 6740.*)

tual surface and sparingly beset with barbellate conic hairs on the elevated primary veins where they diverge from the median vein at the blade base; petioles 2–4 cm long; blades coriaceous when dry, 8.3–16.5 × 4–8 cm, elliptic, apex acuminate to caudate-acuminate, base acute, margin entire, 5-plinerved with the innermost pair of primary veins diverging from the median vein 1–6 mm above the blade base, the transverse secondary veins spaced 1.5–2.5 mm apart at the widest portion of the blade.

Flowers erect, 1 or 2 in each leaf axil of uppermost branches; peduncles 2–3 cm long, essentially terete but sulcate-striate when dry, glabrous and sparingly lenticellate distally. Floral bracts sessile and entire; outer bracts 1.9–2.2 × 1.3–1.6 cm, fused basally for 1.3–1.6 cm at anthesis, elliptic-ovate, acuminate, margin entire, 3- to 5-veined, glabrous throughout; inner bracts 1.4–1.6 × 1.3–1.5 cm, connate basally for 7–8 mm to form a 2-lobed cup-like collar that envelops the hypanthium but is somewhat concealed by the outer bracts, the free portions of the inner bracts rounded-triangular and glabrous, 0.8 × 1.5 cm. Hypanthium (in mature bud) campanulate, 1 cm long to the torus and 1–1.2 cm diam., glabrous. Calyx tube 4–5 mm long; calyx lobes 2–3 mm long and 4–5 mm wide basally, rounded with a callose thickening at the median apex on the abaxial surface, margin essentially entire, glabrous on both surfaces. Petals 6, glabrous, 2.1–2.3 × 1.8–1.9 cm, white, ovate to obovate, apically rounded, entire. Stamens 12, isomorphic; filaments 3.5–4.5 mm long, complanate and glabrous; anthers free, 4–5 mm long, 1.5–2 mm wide, yellow, oblong, laterally compressed with two well-separated pores at the truncate apex; connective somewhat thickened but not dilated into an appendage. Ovary 6-celled, glabrous at the somewhat elevated apex but lacking a collar. Style glabrous, 14.5–17 mm long in mature bud; stigma truncate. Mature berry and seeds not seen.

Distribution and phenology. Known only from the type collection.

The outstanding feature of *B. perforata* is the swollen perforated nodes of distal branches that appear to function as ant domatia. This adaptation is unknown among other Mesoamerican species of *Blakea*. What appear to be functionally similar structures among the Melastomataceae are produced in a few South American species of *Miconia*, a few species of the closely related genus *Topobea*, an as yet unpublished new genus of the tribe Miconieae (Schnell, 1996), and in the Old World genus *Pachycentria* (Maxwell, 1978).

Blakea perforata is most similar to *B. tapantiana* Umaña & Almeda and *B. cuneata* Standley in foliar and floral morphology. The former differs in having shorter floral peduncles (0.6–1 cm), narrower outer floral bracts (0.8–1.1 cm) that are fused basally for only 3–6 mm (vs. 13–16 mm in *B. perforata*), and uppermost nodes with tufts of coarse hairs that fall away to leave a distinct interpetiolar ridge or line. *Blakea cuneata*, a species of northern Central America, differs in having shorter floral peduncles (0.4–1.2 cm), larger calyx lobes (4–8 × 6–9 mm), pink petals, outer floral bracts that are fused basally for only 0.7–1 cm, and leaf blades that are glabrous to sparsely stellulate-furfuraceous abaxially where the primary veins diverge from one another at the base.

25. Blakea purpusii Brandegee, Univ. Calif. Publ. Bot. 6: 58. 1914. TYPE: Mexico. Chiapas: Cerro del Boqueron, *Purpus 6786* (holotype, UC; isotypes, BM, F, MO, NY, US).

Distribution and phenology. Endemic to Volcán Tacaná on the Chiapas, Mexico-Guatemala border and Volcán Tajumulco and environs in western Guatemala in cloud forests at 1300–2700 m. Collected in flower from October through December and in August, in fruit in March.

Blakea purpusii is most similar to a group of four southern Central American species that includes *B. austin-smithii* Standley, *B. chlorantha* Almeda, *B. gregii* Almeda, and *B. penduliflora* Almeda. All five members of this species group produce copious nectar and have pendent flowers with imbricate, pale green petals that are bell-like at anthesis. The southern Central American species have dark purple anthers and a similar purple flush at the base of each petal and anther filament. Field studies by Lumer (1981) and Lumer and Schoer (1986) have shown that *B. austin-smithii*, *B. chlorantha*, and *B. penduliflora* are visited and pollinated by six species of rodents belonging to four genera.

Blakea purpusii is geographically isolated from the other green-flowered members of the genus and also differs in having bright yellow anthers, red filaments, and green petals flushed with bright red basally. On 23–24 November 1980 I studied this species in the field on the southeastern slopes of Volcán Tacaná in Chiapas, Mexico. Copious nectar was noted in numerous flowers at 3:00 p.m. on the afternoon of the first day and many flowers in the same population also had copious amounts of nectar the following morning at 8:00 a.m. During both days the white-eared hummingbird (*Hylocharis leucotis*) was observed visiting numerous individuals of this species, taking nectar, and evidently pollinating the flowers. To my knowledge, no other observations have ever been made on possible pollinators of this species.

26. Blakea repens (Ruiz & Pavón) D. Don, Mem. Wern. Soc. 4: 325. 1823. *Valdesia repens* Ruiz & Pavón, Syst. 121. 1798. TYPE: Peru. Huánuco: Chinchao, *Ruiz & Pavón s.n.* in 1795 (holotype, MA; isotype, BM ex herb. Lambert).

Blakea incerta J. F. Macbride, Field Mus. Publ. Bot. 4: 179. 1929. TYPE: Peru. Huánaco: Cushi, 5000 ft., 19–23 June 1923, *Macbride 4850* (holotype, F).

Distribution and phenology. In the area under study this species is known from two collections made in the Fortuna region of Panama where it occurs in cloud forests at 1150–1400 m. It ranges southward to Colombia, Ecuador, and Peru. Collected in flower in February and April.

The South American populations of this species generally have larger leaves (14–21 × 6–12 cm), but they are otherwise a good match for Panamanian material in salient features such as nodal stipuliform flaps, free floral bracts, laterally connate anther sacs, glandular-puberulent styles, and the distinctive staminal appendages.

27. Blakea scarlatina Almeda, Proc. Calif. Acad. Sci. 46: 314. 1990. TYPE: Costa Rica. Alajuela: 20–30 km SE of Cataratas de San Ramón, 2150–2500 ft. (655–762 m), 20 Mar. 1978, *Almeda et al. 4308* (holotype, CAS).

Distribution and phenology. Local and uncommon mostly in the Caribbean lowlands and adjoining slopes of Nicaragua and Costa Rica in rainforest and cloud forest at 0–1450 m.

In the past some collections of this species have been erroneously identified as *B. cuneata* Standley and *B. grandiflora* Hemsley. *Blakea scarlatina* differs from both of these species in having broader floral bracts, larger flowers with brilliant red petals, and very different, prominently spurred anther connectives.

28. Blakea storkii (Standley) Almeda, comb. nov. Basionym: *Topobea storkii* Standley, Field Mus. Nat. Hist., Bot. Ser. 18: 844. 1938. TYPE: Costa Rica. Cartago/San José border: La Chonta, near Santa María de Dota, 27 May 1928, *Stork 2308* (holotype, F).

Blakea woodsonii Gleason, in Woodson & Schery, Ann. Missouri Bot. Gard. 26: 296. 1939. Syn. nov. TYPE: Panama. Chiriquí: vicinity of Casita Alta, Volcán de Chiriquí, ca. 1500–2000 m, 28 June–2 July 1938, *Woodson et al. 951* (holotype, NY; isotypes, MO, NY, US).

Topobea grandiflora Suessenguth, Bot. Jahrb. Syst. 72: 278. 1942. Syn. nov. TYPE: Costa Rica. Chirripó Grande, elev. 2000 m, 30 Apr. 1932, *Kupper 1206* (holotype, M, MO photo, P photo, US photo).

Free-standing tree 4–10 m tall or coarse epiphytic shrub 1.5–6 m tall often overtaking crown of host tree. Upper branchlets essentially glabrous, somewhat compressed-rounded becoming rounded-quadrate with age. Vegetative buds moderately to densely covered with deciduous subulate, minutely barbellate hairs intermixed with or replaced by a scurfy paleaceous indument of scalelike exfoliations on very young leaves and petioles. Mature leaves of a pair essentially equal in size, typically glabrous on both surfaces, rarely with a very sparse scattering of subulate scurfy hairs tardily persisting on the elevated primary veins abaxially; petioles 0.9–4 cm long; blades coriaceous, 5.4–15.5 × 3.5–10.7 cm, elliptic to obovate, apex gradually to abruptly acuminate, base acute to obtuse, margin entire, 5-nerved or 5-plinerved with the innermost pair of primaries diverging from the median vein 0.5–0.7 cm above the blade base, the transverse secondary veins spaced 1–3 mm apart at the widest portion of the blade, but these are typically not prominently elevated. Flowers erect, solitary or paired in each leaf axil of uppermost branches; peduncles 0.7–5 cm long, rounded to rounded-quadrate, glabrous or sparingly scurfy-puberulent, often sparingly lenticellate distally. Floral bracts entire; outer bracts 0.9–1.8 × 0.9–1.8 cm, fused for 0.9–1.5 cm to form a cupulate collar that tightly envelops the inner bracts and hypanthium, the shallow lobes broadly depressed-triangular to very broadly rounded, margin entire or with a few coarse subulate hairs restricted to the apex of each lobe, venation typically obscure or only the median vein evident on drying, glabrous but commonly lenticellate basally at the confluence with the pedicel; inner bracts 1.2–1.8 cm long, connate for essentially their entire length to form a cupulate collar that envelops the hypanthium and is concealed in large part by the outer bracts. Hypanthium (at anthesis) campanulate, 1.2–1.9 cm long to the torus and 1.3–1.8 cm diam., glabrous. Calyx tube (in post anthesis and in fruit) 6–8 mm long; free portions of calyx lobes 4–8 mm long and 5–9 mm wide basally, truncate to rounded-truncate, margin entire and somewhat callose-thickened, glabrous on both surfaces at maturity. Petals 6, glabrous, 2–4.2 × 1.5–2.9 cm, white, the exposed abaxial apices sometimes marked with patches of reddish pink in bud, obovate, apically rounded to somewhat obtuse, entire. Stamens 12, isomorphic; filaments 7–12 mm long, glabrous and declined to one side of the flower opposing the style; anthers 4–7 mm long, 2–3 mm wide, yellow, oblong to ovate-oblong in profile view, laterally compressed with the two separated pores positioned at the apex of the truncate summit; connective thickened dorsally and prolonged dorso-basally about 1.5 mm above the anther base into a blunt appendage 0.25–1 mm long. Ovary 6-celled, glabrous at the apex, which is elevated into a cone 2–3 mm long that becomes a low dome-like emi-

nence in fruit. Style declinate, glabrous, 1.9–2.3 cm long; the stigma subtruncate to punctiform. Mature berry red-maroon, ca. 1.5 × 1.5 cm. Seeds beige, mostly 1.5–2 mm long.

Distribution and phenology. A locally common species of wet montane forests from Volcán Turrialba and Altos Tablazo in central Costa Rica southeast through the Cordillera de Talamanca to Cerro Horqueta and Cerro Pate Macho in western Panama at (1100–)1500–2636 m. Flowering and fruiting specimens have been collected throughout the year.

A study of the type specimens of *Topobea storkii*, *Blakea woodsonii*, and *Topobea grandiflora* has revealed that these three named taxa are identical in all details. They represent a single taxonomic entity characterized by inner floral bracts that are unlobed apically and connate for their entire length, outer bracts that are also fused for nearly their entire length to form a tightly enveloping cupulate collar with shallow depressed lobes, and anther connectives that are dilated dorso-basally into a blunt appendage up to 1 mm long. The anthers of this species, which are oblong to ovate-oblong, laterally compressed, blunt at the apex, and with two well-separated apical pores, dictate placement in the genus *Blakea*. The necessary generic transfer is made here since the oldest available epithet for this species was published in *Topobea*. Most of the collections of this species in herbaria have been identified as *Blakea woodsonii*. For comparisons with allied species such as *B. grandiflora* and *B. wilsoniorum*, see the discussion under the latter species.

Most populations of *B. storkii* are uniform morphologically despite their diversity in habit and comparatively broad geographic and elevational distribution. Several collections from the Fortuna and Cerro Colorado regions of western Panama are reminiscent of *B. storkii*, but they are divergent in several characters. Plants from these areas have inner and outer floral bracts that are shorter than the mature calyx lobes. The inner bracts of these collections are fused to form an apically truncate cupulate collar like that found in *B. storkii*. The outer bracts differ from typical *B. storkii* in being fused for half or more of their length with free portions that are ovate and apically acute. Only one of the collections attributable to this problem complex has flowers (*Croat 67774*, CAS). It has anther connectives that lack the dorso-basal appendage that is invariably present in *B. storkii*. In view of these differences and the fact that most of the available collections are fruiting, it seems premature to suggest that it is merely a regional variant. Its taxonomic disposition must await collection and study of more flowering material. Until then, these unusual collections have been provisionally annotated as *Blakea* aff. *storkii* to reflect their apparent affinity.

Representative specimens examined. COSTA RICA. **Cartago:** 8 km N of Trinidad on S-facing slope of Volcán Turrialba, 4 July 1977 (fl), *Almeda et al. 2884* (CAS, CR); 1 km N of Trinidad (middle elev. slope on Volcán Turrialba), 14 Feb. 1969, *Davidse & Pohl 1451* (US); in pastures on slopes of Volcán Turrialba, 6.5 km up road from Trinidad, 16 Aug. 1965, *Lent 723* (MO); Reserva Forestal Río Macho, Cordillera de Talamanca, La Chonta, 10 Apr. 1994 (fl), *Morales et al. 2670* (CAS, INB, MO); 2–3 mi. NW of Pastora, 26 June 1972 (fl), *Primack & Luteyn 209* (CAS, DUKE); ca. 2 km NE of El Empalme along dirt road, 22 Feb. 1978 (fr), *Utley 5811A* (DUKE); 6 km below Finca Central on Volcán Turrialba, 4 July 1977 (fl), *Wilbur 21919* (DUKE). **Cartago/San José:** along Interamerican Hwy., 0.8 mi. beyond La Trinidad, Cordillera de Talamanca, 21 May 1972 (fl), *Luteyn 2966* (DUKE); ca. 1 km S of El Empalme, 4 July 1976 (fl), *Wilbur 19881* (DUKE); ca. 1.5 km SE of La Trinidad or 14.3 km SE of El Empalme, 12 July 1977, *Wilbur et al. 22580* (DUKE). **Puntarenas:** Zona Protectora Las Tablas on trail from Biological Station above Finca Las Alturas to Cerro Echandí on S flanks of Cerros Burú, 20 Feb. 1991 (fr), *Almeda et al. 6756* (CAS, CR); Cordillera de Talamanca, area around Río Canasta, 9.5 airline km NW of Agua Caliente, between Cerro Frantzius and Cerro Pittier, 6 Sep. 1984 (fl), *Davidse et al. 28467* (CAS, MO). **San José:** 2–6 km S of Higuito on lower slopes of Alto Tablazo, 20 Feb. 1978 (fr), *Almeda & Nakai 3749* (CAS, CR). **San José:** Cantón de Pérez Zeledón, P. N. Chirripó, Cuenca Térraba-Sierpe, sendero a Cerro Chirripó, 9°27′24″N, 83°32′47″W, 4 May 1997 (fl), *Gamboa & Alfaro 1338* (INB); Cantón de Coto Brus Las Mellizas, siguiendo linea divisoria entre CR y Pan., entre Cerro Nubes y Cerro Pando, 8°55′18″N, 82°43′30″W, 15 Aug. 1989 (fl), *Herrera 3415* (INB). **San José/Cartago border:** 0.8 mi. beyond La Trinidad off of the Interamerican Hwy., 21 May 1972 (fl), *Luteyn 2966* (CAS, CR, DUKE); Cordillera de Talamanca, 14.3 km SSE of El Empalme, 12 July 1977 (fl), *Almeda et al. 3046* (CAS, CR). **San José:** E edge of Cerro Tablazo and ca. 5 km by winding rd. W of Tablón, 16 July 1981 (fl), *Wilbur et al. 31487* (DUKE). PANAMA. **Bocas del Toro:** Cordillera de Talamanca, headwaters of the Río Culubre, 6 airline km NW of the peak of Cerro Echandí, 2–3 Mar. 1984 (fr), *Davidse et al. 25256* (CAS, MO); trail from near Boquete to Cerro Pate Macho, forest slopes along divide and below, 7 Feb. 1986 (fl), *McPherson & Merello 8308* (CAS, MO). **Chiriquí:** límite del Parque Internacional La Amistad, frente a la Población de Guadalupe, 21 Mar. 1990 (fr), *Aranda et al. 1213* (CAS, PMA); vicinity of Volcán Barú, near shore at Lago del Volcán, 9 June 1986 (fl), *McPherson 9463* (CAS, MO); 6 mi. above Cerro Punta on the Boquete trail, 1 Mar. 74 (fr), *Tyson 7085* (DUKE); slopes approaching Cerro Horqueta about 6.6 km NNE of Boquete, 5 Jan. 1975 (fl & fr), *Wilbur & Luteyn 19312* (CAS, DUKE).

29. Blakea subconnata Berg ex Triana var. **obtusa** Gleason, Bull. Torrey Bot. Club 72: 388. 1945. TYPE: Colombia. Valle: W slope of the Cordillera Occidental, 1400 m, *Cuatrecasas 15644* (holotype, NY).

Distribution and phenology. In the area under study known only from north-central Panama (Comarca de San Blas) in rainforests at 30–200 m ranging south to Colombia. Collected in flower from October through December, in immature fruit in December.

The floral bracts on the four known Panamanian collections of this variety are smaller than typical material from Colombia, but they are otherwise identical in their complete glabrosity, quadrate upper branchlets with carinate angles, basally vaginate petioles, and laterally connate anther thecae. The taxonomic status of this variety will need reassessment as more collections come to light.

30. Blakea tapantiana Umaña & Almeda, Novon 5: 1. 1995. TYPE: Costa Rica. Cartago: Parque Nacional Tapantí, Sendero Oropéndola, 1200 m, 3 Sep. 1992, *Umaña et al. 497* (holotype, CR; isotypes, CAS, COL, F, K, MEXU, MO, US, USJ, WIS).

Distribution and phenology. Endemic to Costa Rica where it is largely restricted to cloud forests of Tapantí National Park and adjacent areas at 1150–1450 m. Collected in flower from August through September, in fruit from March through April.

This little-collected species is distinguished by its short floral peduncles (0.6–1 cm), completely white narrowly obovate petals, and interpetiolar tufts of coarse hairs on uppermost branchlet nodes that fall away with age to leave a distinct interpetiolar line or ridge.

31. Blakea tuberculata Donnell Smith, Bot. Gaz. 31: 111. 1901. TYPE: Costa Rica. San José: La Palma, 1550 m, 15 Aug. 1898, *Tonduz 7363* (holotype, US; isotypes, CR, F, K, NY).

Distribution and phenology. Locally common in cloud forests at 700–1750 m in Costa Rica and Panama. Flowering and fruiting all year.

For notes on the relationships and variation of this species, see the discussion following *B. calycosa.*

32. Blakea wilburiana Almeda, Brittonia 26: 394. 1974. TYPE: Panama. Coclé: near La Mesa about 5 mi. N of El Valle, 22 May 1970, *Wilbur & Luteyn 11734* (holotype, DUKE; isotypes, CAS, CR, DS, F, G, GH, K, MEXU, MICH, MO, NY, PMA, TEX, UC, US).

Distribution and phenology. Local and uncommon in cloud forests from the El Copé (Coclé) region of central Panama east to Nusagandi (Comarca de San Blas) with one known outlying population in Chiriquí Province at 250–1000 m. Collected in flower sporadically throughout the year, in fruit during February, April, July, and October.

33. Blakea wilsoniorum Almeda, sp. nov. TYPE: Costa Rica. Puntarenas: along main San Vito–Ciudad Neily road, ca. 0.8 km S of turnoff to Valle Azul, 8°46′N, 82°57′W, elev. ca. 1130 m, 13 Sep. 1985, *M. Grayum et al. 6023* (holotype, CAS; isotypes, CR, MO, US). Figure 4.

Frutex epiphyticus vel arbor ad 5–8 m alta. Petioli 1–1.8 cm longi; lamina 10.5–19.5 × 5.3–9 cm, elliptica vel elliptico-obovata apice acuminata basi acuta, 5-plinervata ad maturitatem coriacea et glabra, nervis secundariis 2–4 mm inter se distantibus. Flores 6-meri in quoque nodo superiore 1–2, pedunculares 1–1.8 cm longis; bracteae exteriores 2–2.6 × 2.2–2.7 cm ovatae vel suborbiculares ca. 1.3–1.7 cm coalitae apice rotundato; bracteae interiores 1.5–1.9 cm omnino coalitae. Hypanthium (ad torum) 1.2–1.5 cm longum; calycis tubus 4–5 mm longus, lobis 3–4 × 7–10 mm rotundatis usque truncatis. Petala 2–3 × 2–3 cm obovata apice rotundato vel truncato. Antherae 6 × 3 mm oblongae inter se lateraliter non cohaerentes apice minute biporosae; connectivum ad basim dorsaliter nec prolongatum nec appendiculatum. Ovarium 6-loculare, cono 2–2.5 mm alto glabro (collo non evoluto).

Free-standing tree 5–8 m tall or epiphytic shrub 2–4 m tall. Upper branchlets glabrous, distinctly quadrate to sulcate becoming rounded-quadrate with age. Vegetative buds and very young peduncles moderately to densely covered with a deciduous indument of subulate, barbellate or dendritic hairs that vary toward and are intermixed with scurfy paleaceous hairs that have irregular lacerate margins. Mature leaves of a pair essentially equal in size, glabrous on both surfaces; petioles 1–1.8 cm long; blades coriaceous, 10.5–19.5 × 5.3–9 cm, elliptic to elliptic-obovate, apex acuminate, base acute, margin entire, 5-plinerved with the innermost pair of primaries diverging from the median vein 0.6–1.2 cm above the blade base, the transverse secondary veins spaced 2–4 mm apart at the widest portion of the blade but these are not prominently elevated. Flowers erect, solitary or paired in each leaf axil of uppermost branches; peduncles 1–1.8 cm long, somewhat compressed and 2-edged, glabrous but lenticellate distally. Floral bracts sessile, entire; outer bracts 2–2.6 × 2.2–2.7 cm, fused basally for 1.3–1.7 cm to form a collar that tightly envelops the inner bracts and hypanthium, the two lobes broadly ovate, to semicircular, sometimes varying to broadly deltoid, apex obtuse to broadly

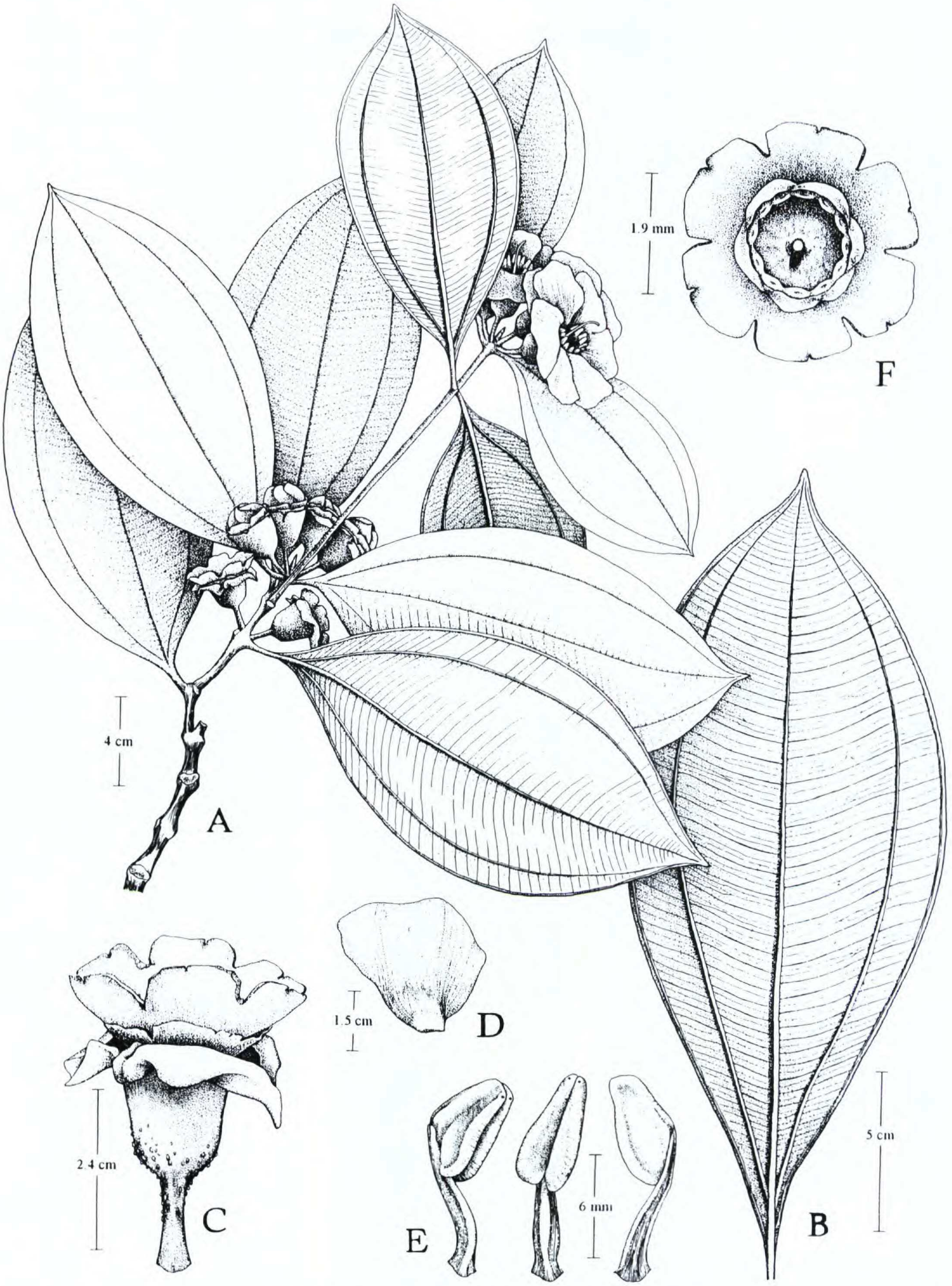

Figure 4. *Blakea wilsoniorum* Almeda. —A. Habit. —B. Representative leaf (abaxial surface). —C. Flower with petals, androecium, and style removed. —D. Petal (adaxial surface). —E. Stamens, 3/4 view (left), ventral view (middle), lateral view (right). —F. Hypanthium (top view) showing ovary summit, torus and calyx lobes. (A from *Almeda et al. 4292* and *Grayum et al. 6023*; B from *Croat 26546*; C & E from *Almeda et al. 4292*; D & F from *Grayum et al. 6023*.)

rounded, margin entire but undulate-involute, only the median vein typically evident on drying, glabrous or moderately to sparingly covered with an indument like that of vegetative buds, lenticellate basally at the confluence with the pedicel; inner bracts 1.5–1.9 cm long, connate for their entire length to form an apically flaring collar that tightly envelops the hypanthium but is typically concealed in large part by the outer bracts. Hypanthium (at anthesis and in young fruit) campanulate to cupulate, 1.2–1.5 cm long to the torus and 1–1.7 cm diam., glabrous. Calyx tube 4–5 mm long; free portions of calyx lobes 3–4 mm long and 7–10 mm wide basally, rounded-truncate, margin essentially entire and callose-thickened, glabrous on both surfaces. Petals 6, glabrous, 2–3 × 2–3 cm, reportedly pink or white flushed with red, obovate, apically rounded (sometimes obliquely so), truncate or retuse, entire. Stamens 12, isomorphic; filaments 8–8.5 mm long, complanate, glabrous and declined to one side of the flower opposing the style; anthers 6 mm long, 3 mm wide, free, yellow, oblong, laterally compressed with two well-separated pores positioned on the ventral side of the truncate apex; connective dilated dorso-medially into an elongate thickening. Ovary 6-celled, glabrous at the apex, which is elevated into a prominent cone 2–2.5 mm long on immature fruits but lacking a collar. Style somewhat declinate, glabrous, 1.9–2.2 cm long; the stigma subtruncate. Immature berry 1.3 × 1.5 cm. Seeds beige, mostly 1.5 mm long.

Distribution and phenology. A locally common species of wet forests known only from southeastern Costa Rica in a region extending from Helechales to Ciudad Neily west to the Las Lagunas area in adjacent Panama at 960–1400 m. Collected in flower in July and August, in fruit from August into March.

In general appearance *B. wilsoniorum* resembles *B. grandiflora* and *B. storkii*, both of which can also be free-standing trees or coarse epiphytic shrubs. All three of these species also have relatively large flowers with yellow anthers and white petals that are flushed with reddish pink apically and along the margins on the abaxial surface. *Blakea wilsoniorum* is readily distinguished from both of these species by its unappendaged anther connectives, consistently short floral peduncles (1–1.8 cm), and outer floral bracts that are fused for 1.3–1.7 cm basally but free apically with two flaring lobes that are broadly ovate to semicircular, obtuse to broadly rounded apically, and undulate-involute at the margins. In details of its inner floral bracts, *B. wilsoniorum* is most like *B. storkii*. In both species the inner bracts are fused for essentially their entire length to form an unlobed cupulate collar that closely envelops the hypanthium. In *B. storkii*, the outer floral bracts are somewhat shorter than the inner bracts such that the entire truncate apices of the fused inner bracts are always visible on flowering and fruiting hypanthia. In *B. wilsoniorum*, the outer floral bracts exceed and typically conceal the inner bracts.

Blakea wilsoniorum and *B. storkii* have overlapping geographic ranges, but the latter typically occurs at higher elevations (1500–2500 m), which accounts for the fact that they have never been found growing together. The allopatric *B. grandiflora*, with a more northern distribution centered in Costa Rica's Cordillera Central and northern Cordillera de Talamanca, also occurs at higher elevations (1500–2500 m) than *B. wilsoniorum*.

This species is named for the late Robert and Catherine Wilson, founders of the Robert and Catherine Wilson Botanical Garden, a part of the Las Cruces Biological Field Station of the Organization for Tropical Studies in southern Costa Rica. When the Wilsons went to Costa Rica in 1961 they had a vision of creating a unique mid-elevation tropical garden along a ridge of the Fila Zapote just south of the town of San Vito de Java. In creating this garden and preserving a rainforest reserve of 361.5 acres they established a haven for the survival of this species and a setting in which countless researchers, students, and the lay public from both Costa Rica and abroad have been inspired and educated about tropical biology.

Paratypes. COSTA RICA. **Puntarenas:** vicinity of Las Cruces Tropical Botanical Garden (now Wilson Botanical Garden) about 6.4 km S of San Vito de Java, 18 Mar. 1978 (fr), *Almeda et al. 4292* (CAS, CR); valley of the Río Negro between La Unión and Cortu, 8 Aug. 1974 (fl), *Croat 26546* (CAS); forest and edges on and around Wilsons' finca, 6 km S of San Vito de Java, 16 Aug. 1967 (fr), *Raven 21807* (CR, DUKE, MO); Helechales, 14 Feb. 1966 (fr), *Schnell 460* (US); vicinity of Finca Las Cruces, San Vito de Java, 22–25 Aug. 1968 (fl), *Schnell 1061* (CR, US); Finca Las Cruces, San Vito de Java, 20 Aug. 1969 (fl), *Schnell 1071* (CR); Finca Las Cruces, S of San Vito, 28 July 1977 (fl), *Webster et al. 22096* (CAS, CR, DAV). PANAMA. **Chiriquí:** Las Lagunas area W of El Hato del Volcán, 8°47′N, 82°40′W, 23 Aug. 1982 (fl), *Hamilton et al. 935* (CAS).

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